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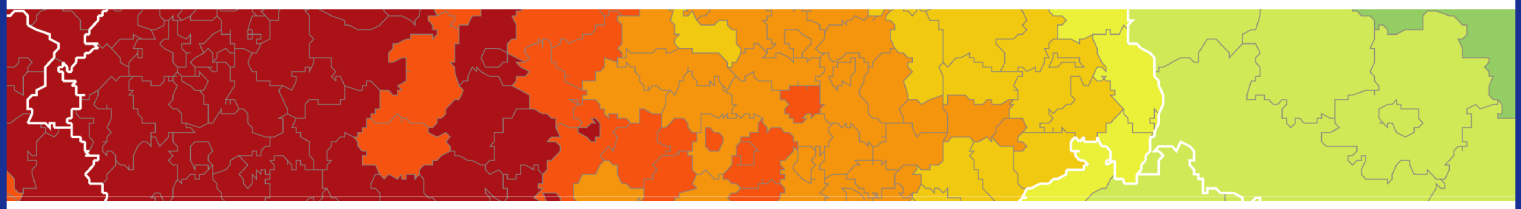

ESCAPE

European Shrinking Rural Areas:

Challenges, Actions and Perspectives for Territorial Governance

Applied Research

Final Report – Annex 2
Measuring, Mapping and Classifying Simple and Complex Shrinking

Annex 2

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Final Report – Annex 2

Measuring, Mapping and Classifying Simple and Complex Shrinking

ESCAPE
European Shrinking Rural Areas: Challenges, Actions and Perspectives for Territorial Governance

Version 21/12/2020

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Abbreviations

ANOVA	Analysis of variance
CAP	Common Agricultural Policy
CF	Cohesion Fund
DG REGIO	The European Commission's Directorate-General for Regional and Urban Policy
EAFRD	European Agricultural Fund for Rural Development
EC	European Commission
ERDF	European Regional Development Fund
ESCAPE	European Shrinking Rural Areas: Challenges, Actions and Perspectives for Territorial Governance
ESF	European Social Fund
ESPON	European Territorial Observatory Network
ESPON EGTC	ESPON European Grouping of Territorial Cooperation
EU	European Union
FUA	Functional Urban Area
GDP	Gross Domestic Product
GVA	Gross Values Added
JRC	European Commission Joint Research Centre
LAU	Local Administrative Unit
LUCAS	Land Use and Coverage Area frame Survey
MATRICES	Travel Time Matrices on Accessibility
Max	Maximum
Min	Minimum
MS	Members State (of the European Union)
NACE rev.2	Statistical classification of economic activities in the European Community
NUTS	Nomenclature of Territorial Units for Statistics
Obs.	Number of observations
PPS	Purchasing Power Standards
Std. dev.	Standard deviation

Country names and variable names used in analysis are not listed among the abbreviations.

1 Depopulating countryside: measuring and mapping “simple shrinking”

In this section we report on the activities of Task 1b concerned with mapping patterns of “simple shrinking” across rural regions at NUTS3 and at LAU levels in Europe. “Simple shrinking” refers here to an analysis of rural regions based exclusively on demographic trends. The section includes background information, such as data overview and the identification of rural regions, as well as additional elements on the analysis on “simple shrinking” in rural regions that are not included in the main report, e.g. additional mapping at LAU level.

1.1 Detailed overview of data collected and actions carried out to overcome data problems

The data at NUTS3 level for mapping demographic indicators were collected using two different databases: the Eurostat and the Nordregio databases. The indicators considered cover aspects of general population size, and components for structural population change, i.e. “legacy shrinking” (natural change) and “active shrinking” (net migration) (Table 1). All the selected indicators cover at least a one-generation period (20 years), a reference period mentioned as adequate when analysing demographic decline in shrinking regions (DG for Internal Policies of the Union, 2008). The indicators considered are: total population, population change, net-migration, natural population change, and population projections. Their relatively good data quality (i.e. limited number of years with missing data in a limited number of regions) makes them valuable for the elaboration of typologies that highlight respectively the process of “simple shrinking” in rural regions over a long period of time (i.e. chronology of demographic shrinking) and the main demographic components of the phenomenon of “simple shrinking” (i.e. structural typology of demographic shrinking) across rural regions in Europe.

Although generally reliable, the collected data presented a few challenges. For instance, the year 2001 has been removed for NUTS3 regions in two countries (Bulgaria and Romania). The reason is an important population change between 2001 and 2002 likely to reflect methodological issues in the official statistics published by Eurostat (e.g. estimates based on Census data) rather than an actual population change. As a result, available data for the recent past period only allowed to cover the period 2001-2016 – a bit shorter than a 20-year period. Only a limited number of NUTS3 regions have been excluded, due to a lack of data for a least five years. That was for instance, the case of the outermost region of Guadeloupe (France) and of 30 NUTS3 regions in Eastern Germany. Regional data for the EU Candidate Countries and potential candidate countries were missing in several instances, e.g. missing data on population projection for NUTS3 regions of Turkey, among others, whereas comparable data were found in other instances, e.g. in similar-to-NUTS3 regions in Bosnia-Herzegovina, North-Macedonia, and Serbia.

The 2013 version of the NUTS3 classification has been used as the reference NUTS version in this project. The NUTS conversion tool developed by the JRC [1] was used to convert data based on versions other than the 2013 version in previous deliveries. However, mistakes in the result of the conversion of NUTS 2010 to NUTS 2013 version using the JRC tool have been identified, and thus a manual conversion has been performed to avoid such mistakes in some instances.

Table 1. Data availability at NUTS3 level

Name	Geographical coverage	NUTS level and version	Years collected	Source(s)
Demographic datasets				
Population on 1 January	EU28, Iceland, Norway, Switzerland, North-Macedonia, Turkey	NUTS3 (2013)	2001-2016	Eurostat and Nordregio
Population change	EU28, Iceland, Norway, Switzerland, North-Macedonia, Turkey	NUTS (2013)	2001-2016	Eurostat and Nordregio
Net migration	EU28, Iceland, Norway, Switzerland, North-Macedonia	NUTS3 (2013)	2001-2016	Eurostat and Nordregio
Natural change	EU28, Iceland, Norway, Switzerland, North-Macedonia	NUTS3 (2013)	2001-2016	Eurostat and Nordregio
Population projection on 1 January	EU28, Iceland, Norway, Switzerland	NUTS3 (2013)	2014-2050	Eurostat
Background datasets				
Urban-rural typology	EU28, Iceland, Norway, Switzerland, North-Macedonia, Turkey	NUTS3 (2013)	2013	Eurostat

1.2 Rural regions across Europe

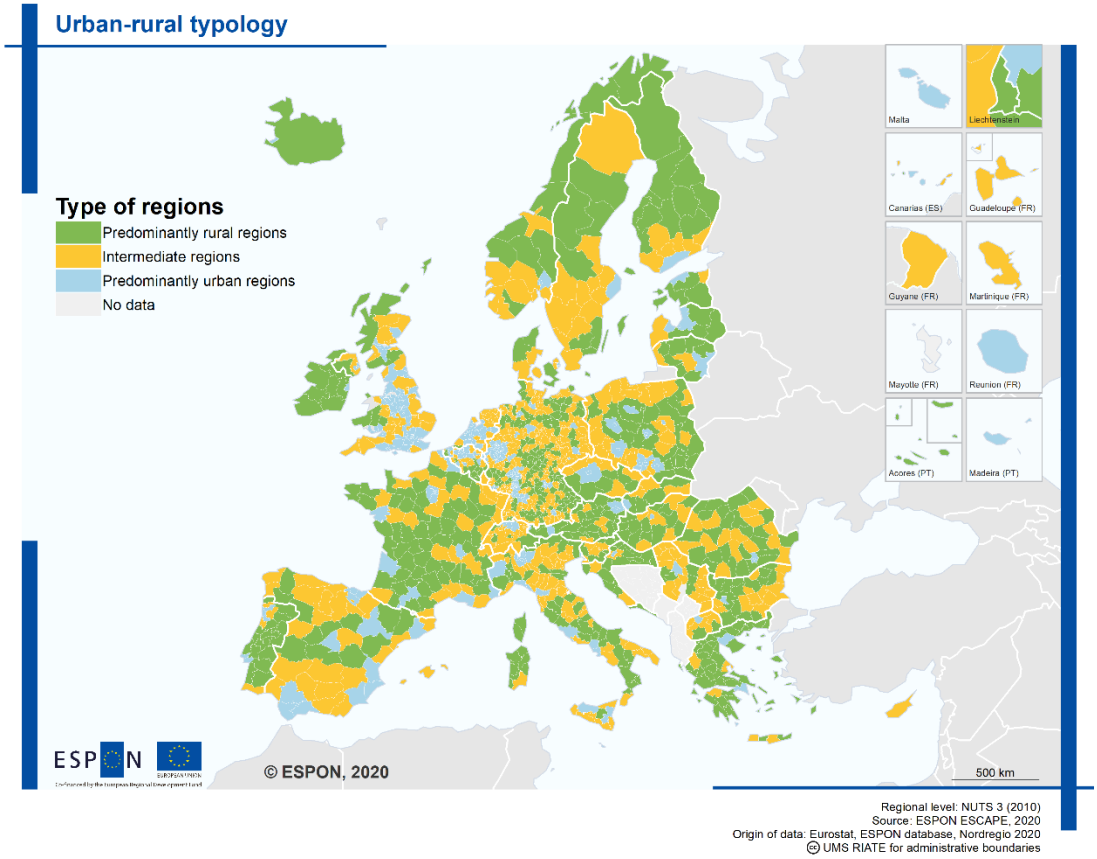
Before doing an analysis of “simple shrinking” in rural regions, it is necessary to define what a rural region is. The use of a Europe-wide typology identifying rural regions has been privileged for this exercise since the scope of the analysis is to investigate all NUTS3 regions across Europe, requiring a common definition. The urban-rural typology developed by Eurostat has been selected. This typology categories European regions as “predominantly urban”, “intermediate”, or “predominantly rural” based on the share of population living in urban areas, the latter being defined as a group of contiguous grid cells of 1 km² with population density above 300 inhabitants per square kilometres and population of at least 5,000 inhabitants (Eurostat, 2019). As a result, a predominantly rural region corresponds to a NUTS3 region where at least 50% of the

[1] Available at: https://urban.jrc.ec.europa.eu/nutsconverter/#/ [Accessed 11 September 2020].

population lives in rural grid cells, an intermediate region has between 50% and 80% of its population living in urban clusters, and a predominantly urban region more than 80% (ibid.).

The ESCAPE project includes both predominantly rural regions and intermediate regions in its definition of rural regions. The reason is that a large number of intermediate regions do have a relatively important part of their territories covered by rural municipalities and areas with a rural character, even though their demographic structure is dominated by one or two urban areas. For instance, Västerbotten, a region in northern Sweden, is categorized as intermediate by the Eurostat urban-rural typology. Most of the inhabitants live in one of the two main urban areas (Umeå and Skellefteå). However, most of the municipalities within this region correspond to rural municipalities, of which several are experiencing demographic shrinking (Grunfelder & Löfving, 2019). Many similar cases can be found in intermediate regions throughout Europe. A NUTS3-level map highlighting the urban-rural typology from Eurostat has been reproduced for this project (Map 1). This map highlights all the intermediate (in yellow) and predominantly rural regions (in green) across Europe, which served as a basis for the mapping exercise on shrinking rural regions in this project.

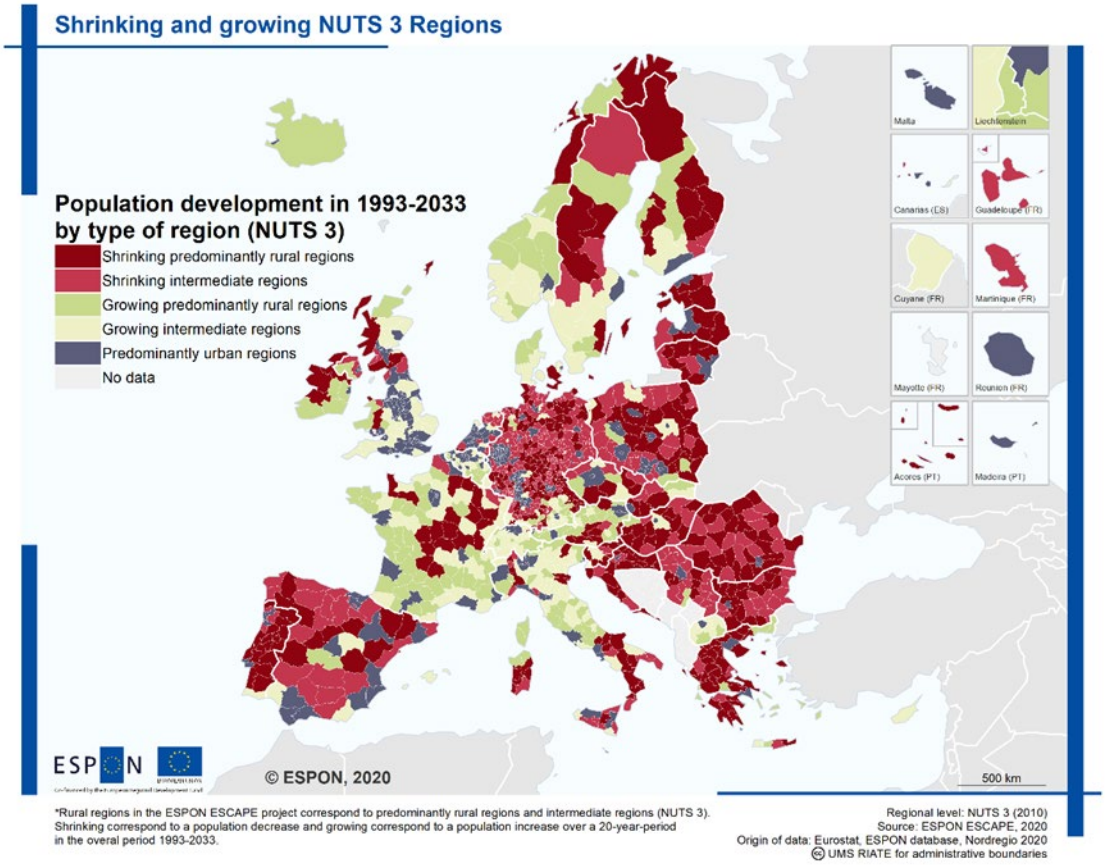
Map 1 : Urban-rural typology at NUTS3 level



As mentioned above, rural regions in this project correspond to both predominantly rural regions and intermediate regions at NUTS3 level. In turn, “shrinking” indicates a population decrease, while “growing” corresponds to a population increase over a 20-year period in the overall period 1993-2033. Map 2 highlights these “shrinking rural regions” by distinguishing between shrinking

predominantly rural regions and shrinking intermediate regions. Here, the 2010 NUTS version is used due to availability of population projections based on this version for 2033. The rest of the European regions have been labelled as “other” since they are not the focus of this project.

Map 2 : Shrinking and Growing NUTS 3 Regions



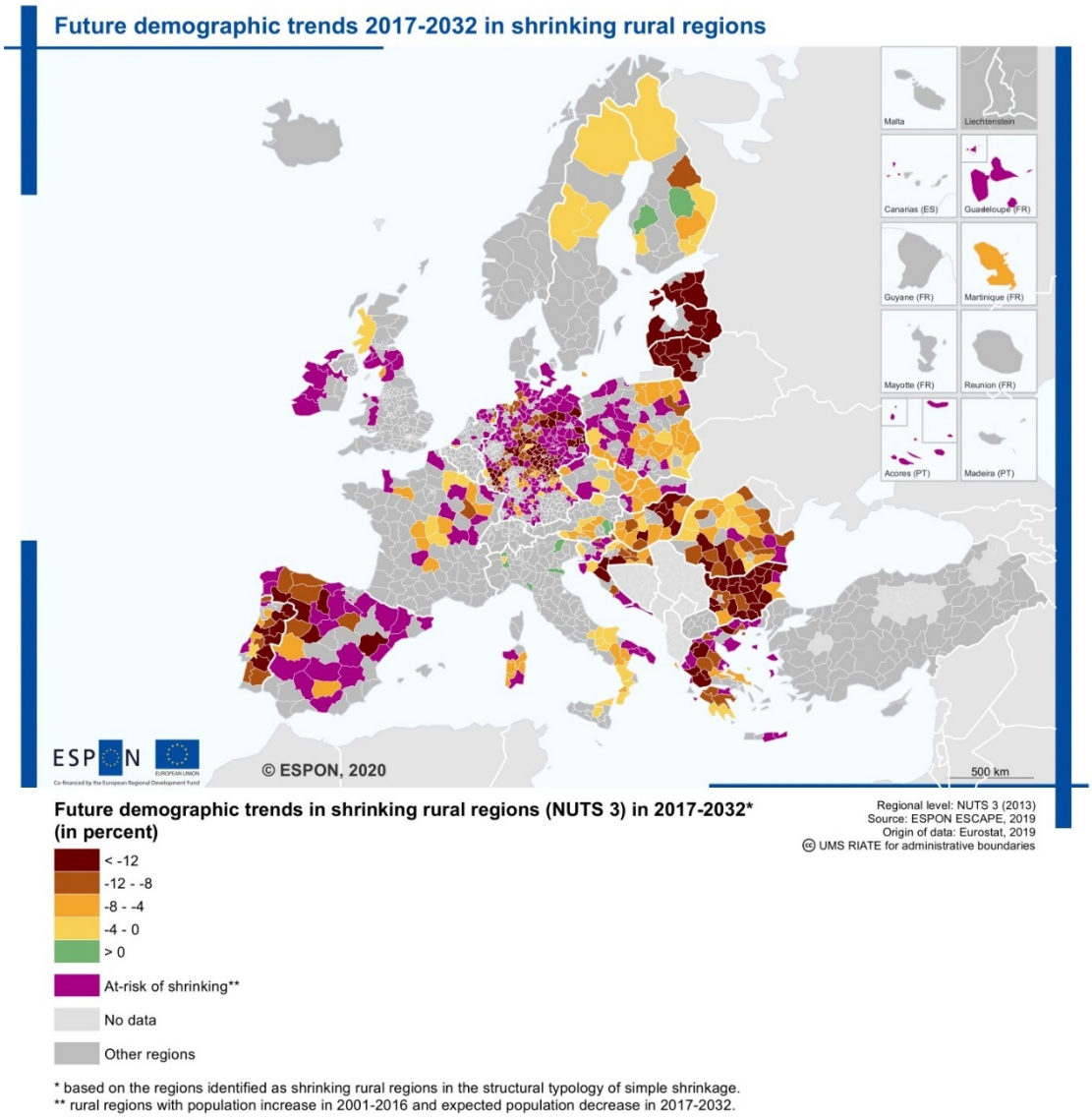
In addition to analysing past population developments in shrinking rural regions across Europe, this project considers also foreseen population developments in these regions. The projection data provided by Eurostat allow us to study demographic change across NUTS3 regions in the next decade. The dataset includes figures on projected total population, which gives a possibility to perform a mapping exercise highlighting population developments in shrinking rural regions.

The analysis of future demographic change used the reference period 2017-2032, which has the same length of the reference period for past trends (2001-2016), to be as close as possible to the idea of covering at least one generation. The class breaks are the same used for the structural typology of shrinking regions 2001-2016 (see main report), namely 0, -4%, -8%, and -12%, to ease comparison between the maps. Unfortunately, the dataset does not include details on the main components of population development (natural change or net migration). However, it still provides an overview of where across Europe one can expect shrinking rural regions to be located.

Map 3 highlights that a majority of the shrinking rural regions identified in the period 2001-2016 are expected to continue shrinking in the period 2017-2032. These regions are coloured in yellow to brown colours, as for instance in rural areas of the three Baltic States, that are expected to continue losing population. Rural regions which gained population in 2001-2016 but are expected to lose population in 2017-2032 are identified on Map 3 as rural regions “at-risk of shrinking”. They are coloured in purple, and are mostly found in Eastern Germany, as well as western parts of Poland, Ireland, Spain, and Greece.

In relative terms, 128 shrinking rural regions are expected to lose more than 12% of their population between 2017 and 2032. These regions are found in the Baltic States, Bulgaria, Eastern Germany, and Portugal. Only eight out of the 399 NUTS3 rural regions which were shrinking in 2001-2016 are expected to increase their total population in the period 2017-2032 (identified in green). They are located in three different countries, namely Austria, Finland, and Italy.

Map 3 : Future demographic trends 2017-2032 in shrinking rural regions



Looking at past and future demographic developments, the total population of shrinking rural regions is expected to decrease from just below 178 million inhabitants in 1993 to ca. 157 million in 2033 (Table 2). This decrease by 21 million inhabitants, as well as the increase in other parts of Europe, results in a decrease of the share of population living in shrinking rural areas from 36.1% in 1993 to 29.2% in 2033.

Table 2 Development of total population in shrinking rural regions 1993-2033.

Shrinking rural regions* (NUTS 2010)	**1993**	**2013**	**2033**
Total population	177,953,968	171,507,912	156,826,168
Share of European population (in percent)	36.1	33.0	29.2
*EU28, Norway, Switzerland, Liechtenstein, and Serbia. Based on Eurostat data.			

1.3 Insight on rural shrinking at local level across Europe

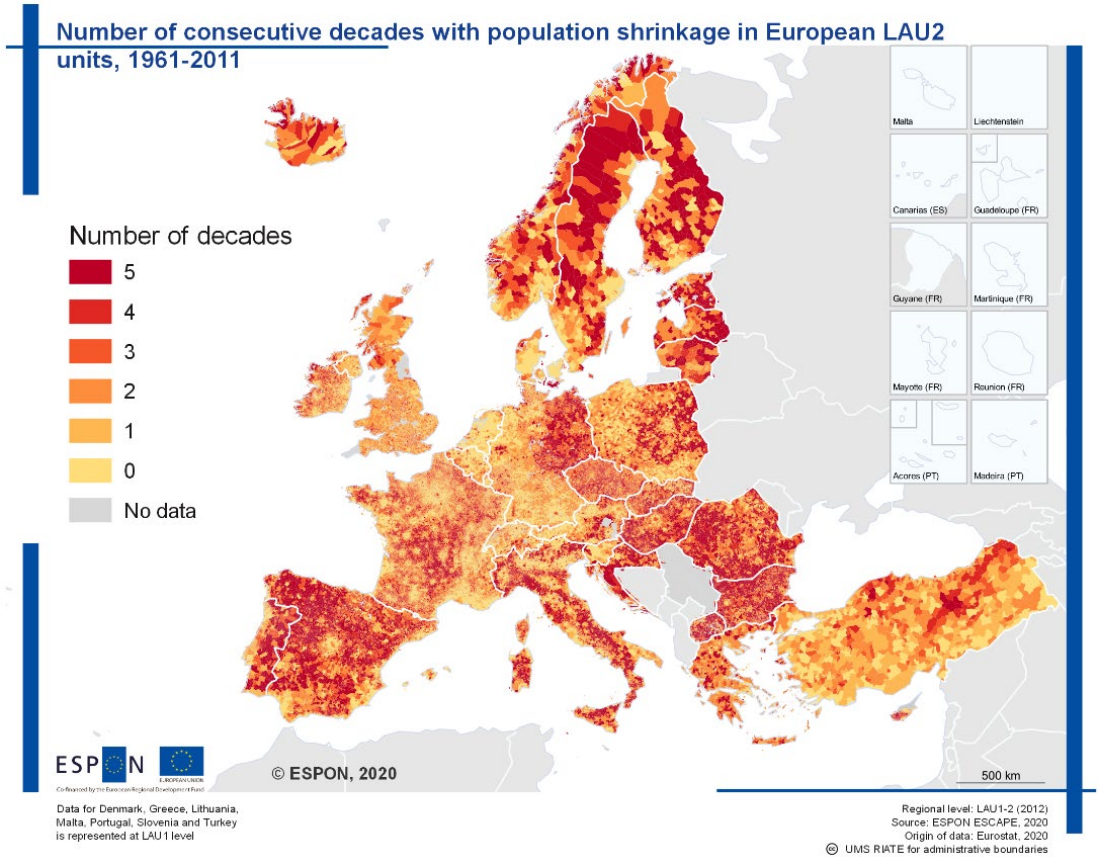
For the investigation of historical perspectives of demographic shrinking, insights on the variance of demographic processes at lower spatial levels could provide valuable information. By using a historical population dataset from 1961 to 2011 by Eurostat (based on a project supported by DG REGIO – Gløersen & Lüer, 2013) and DEGURBA classification, different indicator types were derived to illustrate low-level patterns of "simple shrinking" (Table 3).

Although simple population figures have limited potentials to express different aspects of shrinking – measured by population decrease –, experiments with LAU level historical population numbers can contribute to develop meaningful measures focusing on temporal aspects ("duration") and the extent ("amount") of population loss as well as on the distribution of population dynamics indices within higher territorial structures (NUTS3).

Table 3: Data availability at LAU level

Name	**Geographical coverage**	**NUTS, LAU level (version)**	**Years collected**	**Source(s)**
Demographic dataset				
Population on 1 January	EU28, Iceland, Norway, Switzerland, North-Macedonia, Turkey	LAU1, LAU2 (2012)	1961, 1971, 1981, 1991, 2001, 2011	'Population Data Collection for European Local Administrative Units from 1960 onwards' supported by DG REGIO
Background datasets				
Degree of Urbanisation	EU28, Iceland, Norway, Switzerland, North-Macedonia, Serbia	LAU1, LAU2 (2014)	2014	DEGURBA classification by Eurostat
LAU - NUTS3 correspondence tables	EU28, Iceland, Norway, Switzerland, North-Macedonia	NUTS3 (2013)	2014	Eurostat, national statistical sources

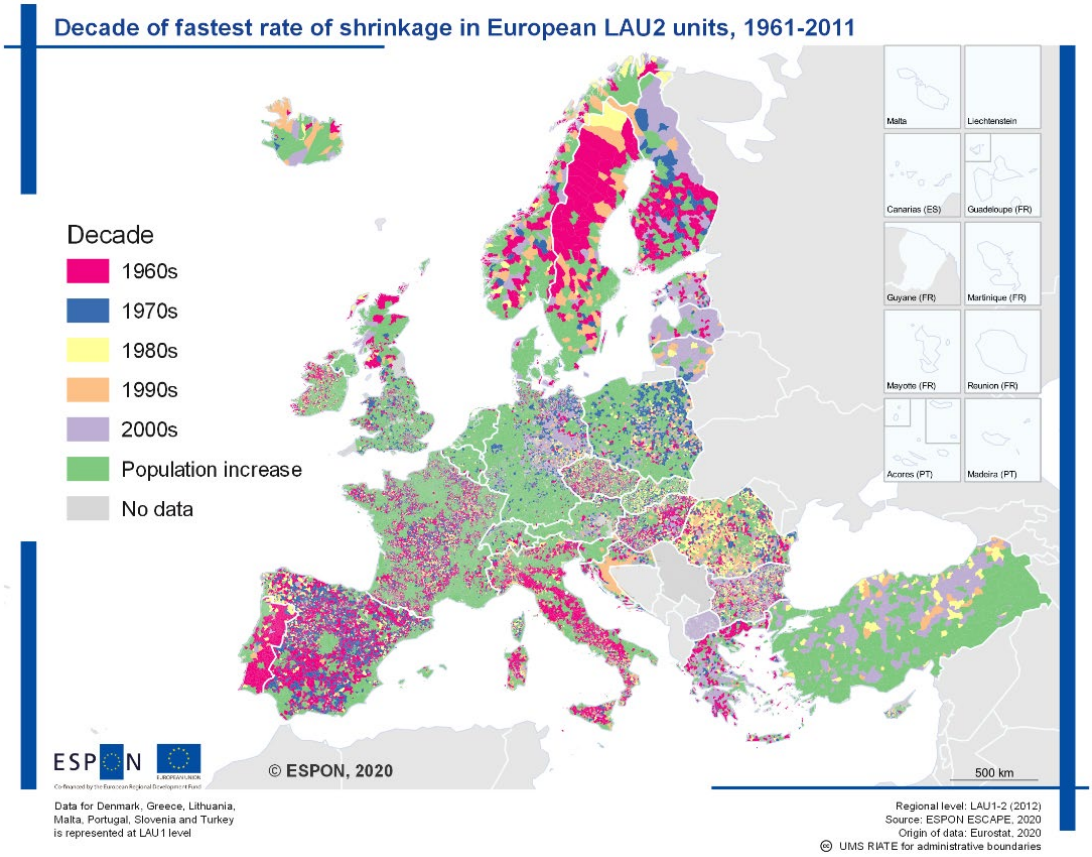
Map 4: Number of consecutive decades with population shrinking in European LAU2 units, 1961-2011



Population figures from 1961 to 2011 allow us to explore if population decrease in an area is part of an historical processes, a new or temporary process, or is related to shrinking tendencies started one-two decades ago. The map on the number of consecutive decades with population decrease shows areas which have been witnessing continuous tendencies of shrinking, even three- to five-decade long periods of population decrease – e.g. in several East-Central European countries, and many parts of Spain, Portugal and Italy as well as peripheral areas of Nordic countries (Map 4). On the contrary, where a LAU unit faces only one or two decades of population loss (in different Western European countries, or in Turkish LAUs), it might indicate temporary tendencies or "natural" fluctuation of population numbers. Otherwise, these periods – observed in consecutive decades – might also designate new areas of vulnerabilities to newly started shrinking processes.

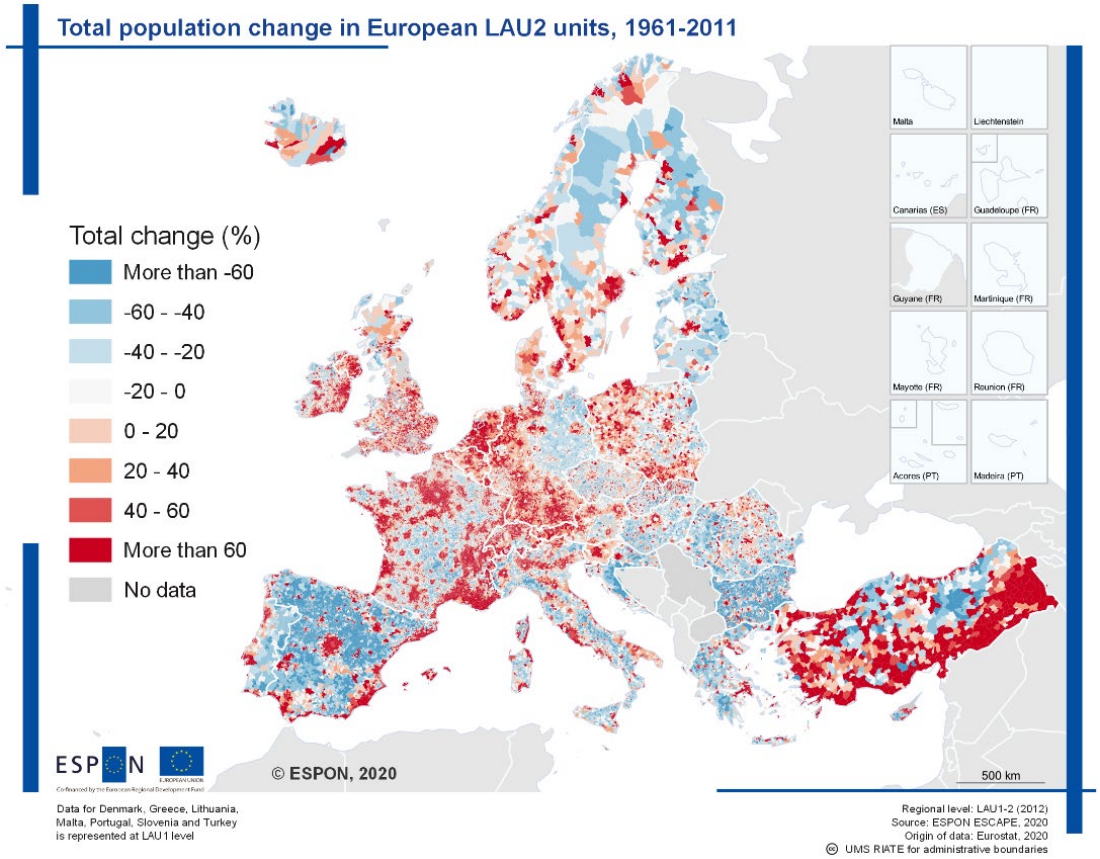
Patterns related to the duration of population shrinking might be shaded off by identifying the period (decade) of the fastest rate of shrinking, which varies mainly between European macro-regions (1960-1980s in Western Europe, 1980-2000s in most of the post-socialist area), and shows even country-specific variations linked to industrialisation (1960s in Portugal and Italy), new opportunities of international migration, and political events such as the programme of rural resettlement called "systematization" in Romania (1980s) or the Balkan Wars in Croatia (1990s) (Map 5).

Map 5: Decade of fastest rate of shrinking in European LAU2 units, 1961-2011



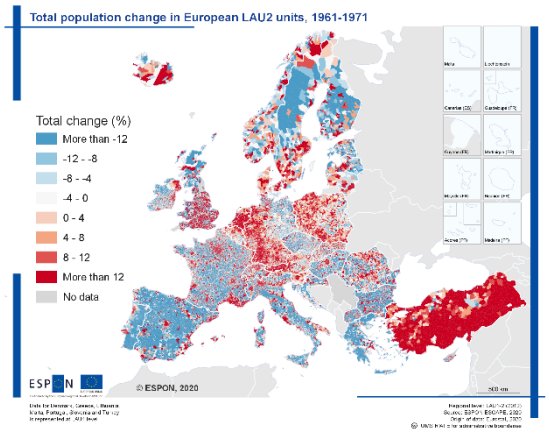
The extent of “simple shrinking” can be measured in many ways at LAU level. Total population change over a longer period (Map 6), total (or average) population change per decade (Map 7), or average population change over different periods (Map 8) all reflect the amount of population loss all over Europe. Spatial patterns of the most affected territories in Europe (e.g. 8-10% or even larger population loss over a decade – on the average or within different periods) locate the areas which are most vulnerable to challenges related to population decrease: Bulgaria, the Baltic countries, the area of the former German Democratic Republic, many parts of Croatia, Italy, Spain, Greece, Portugal etc. Exploring these rates of population change in different contexts (shorter or longer periods) might support the investigation of changing tendencies and spatial patterns of population dynamics, and the identification of starting points of shrinking processes within these areas.

Map 6: Total population change in European LAU2 units, 1961-2011

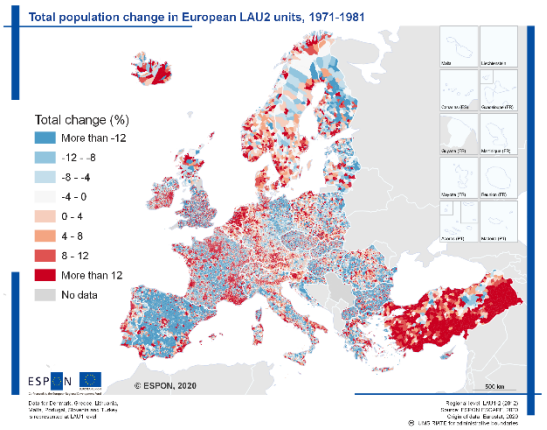


Map 7: Total population change in European LAU2 units over different decades

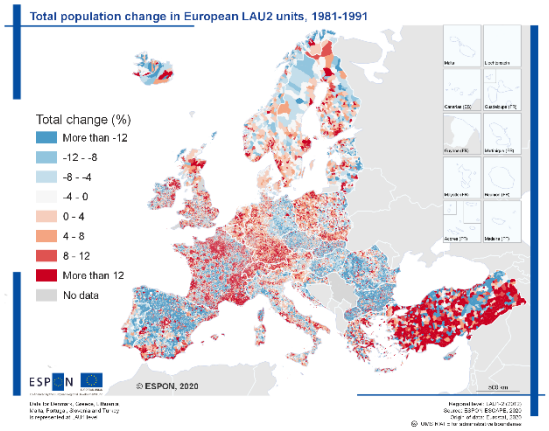
a) 1961-1971



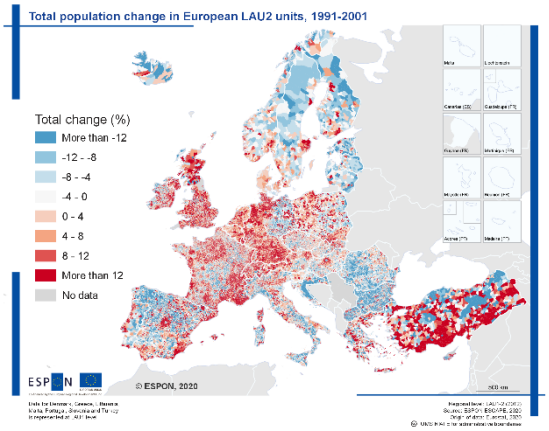
b) 1971-1981



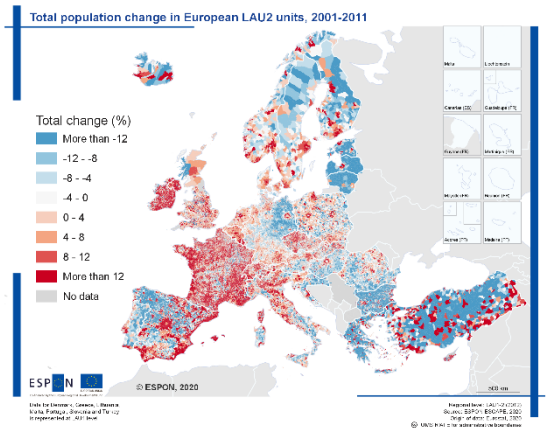
c) 1981-1991



d) 1991-2001

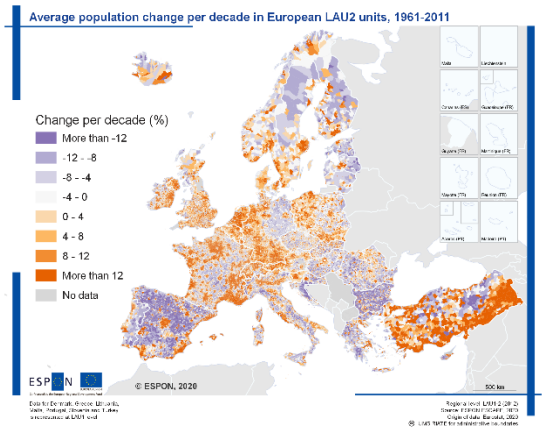


e) 2001-2011

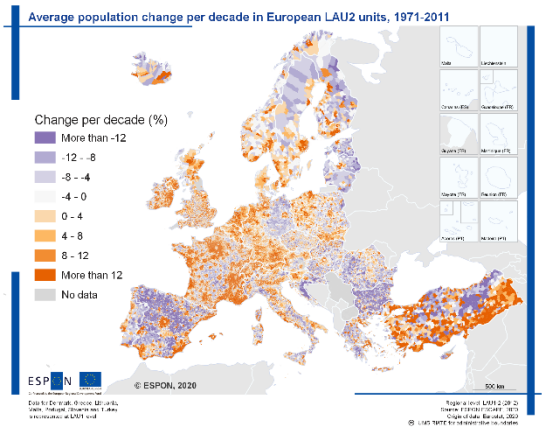


Map 8: Average population change over different times in European LAU2 units

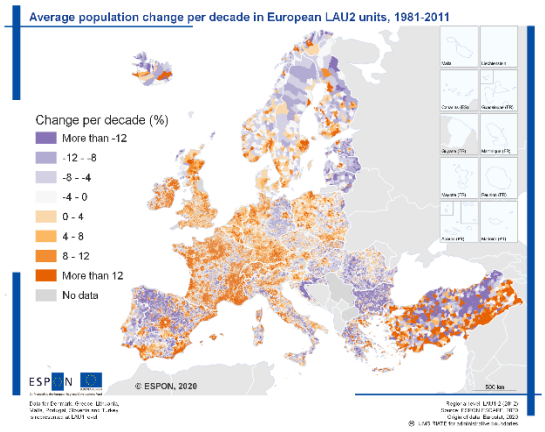
a) 1961-2011



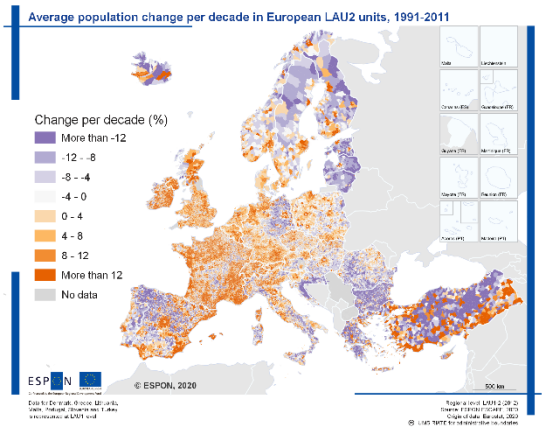
b) 1971-2011



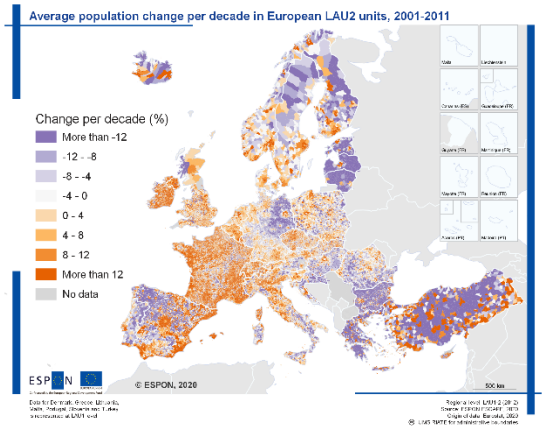
c) 1981-2011



d) 1991-2011



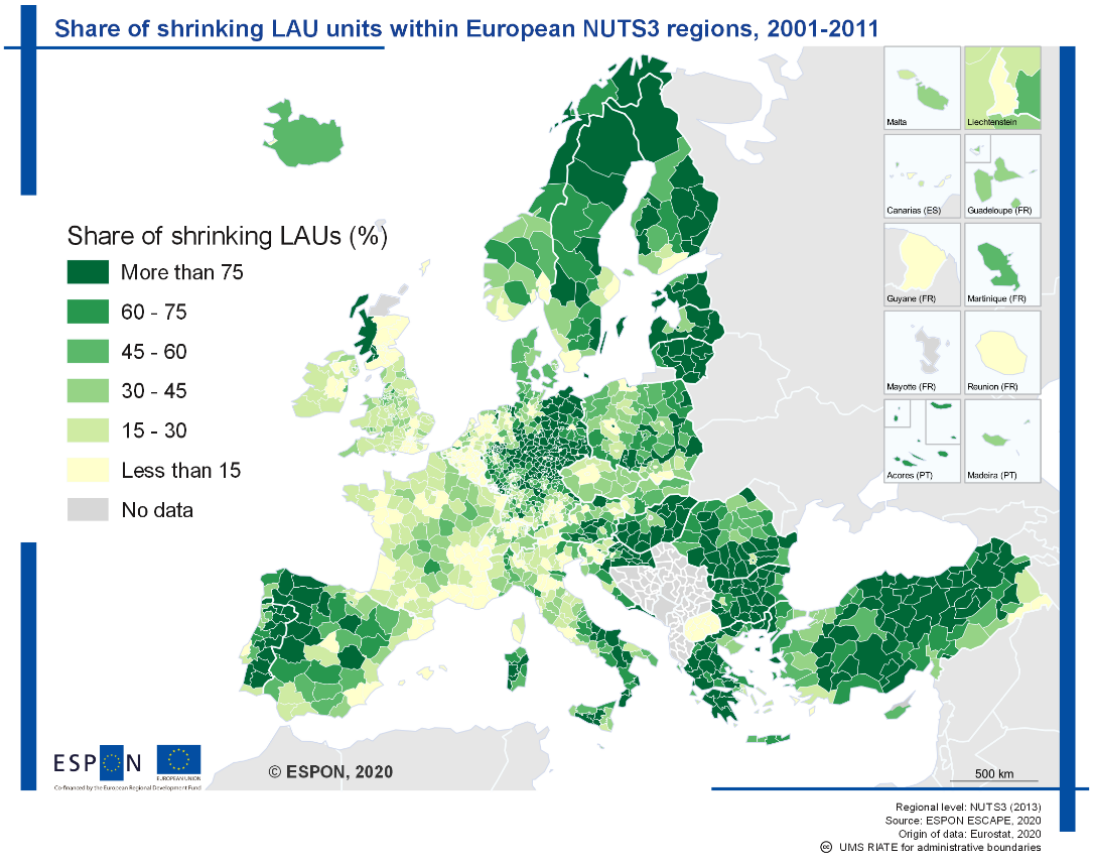
e) 2001-2011



Information derived from LAU-level population dynamics also provides valuable evidence for aggregated patterns at NUTS3 level. Spatial distribution of the aggregated share of population living in shrinking LAUs, or the share of shrinking LAUs within a NUTS3 region show that the highest values of these indicators can be observed in East-Central European countries, such as the Baltic States, Croatia, Hungary, Romania, and Bulgaria. Besides, these values are also

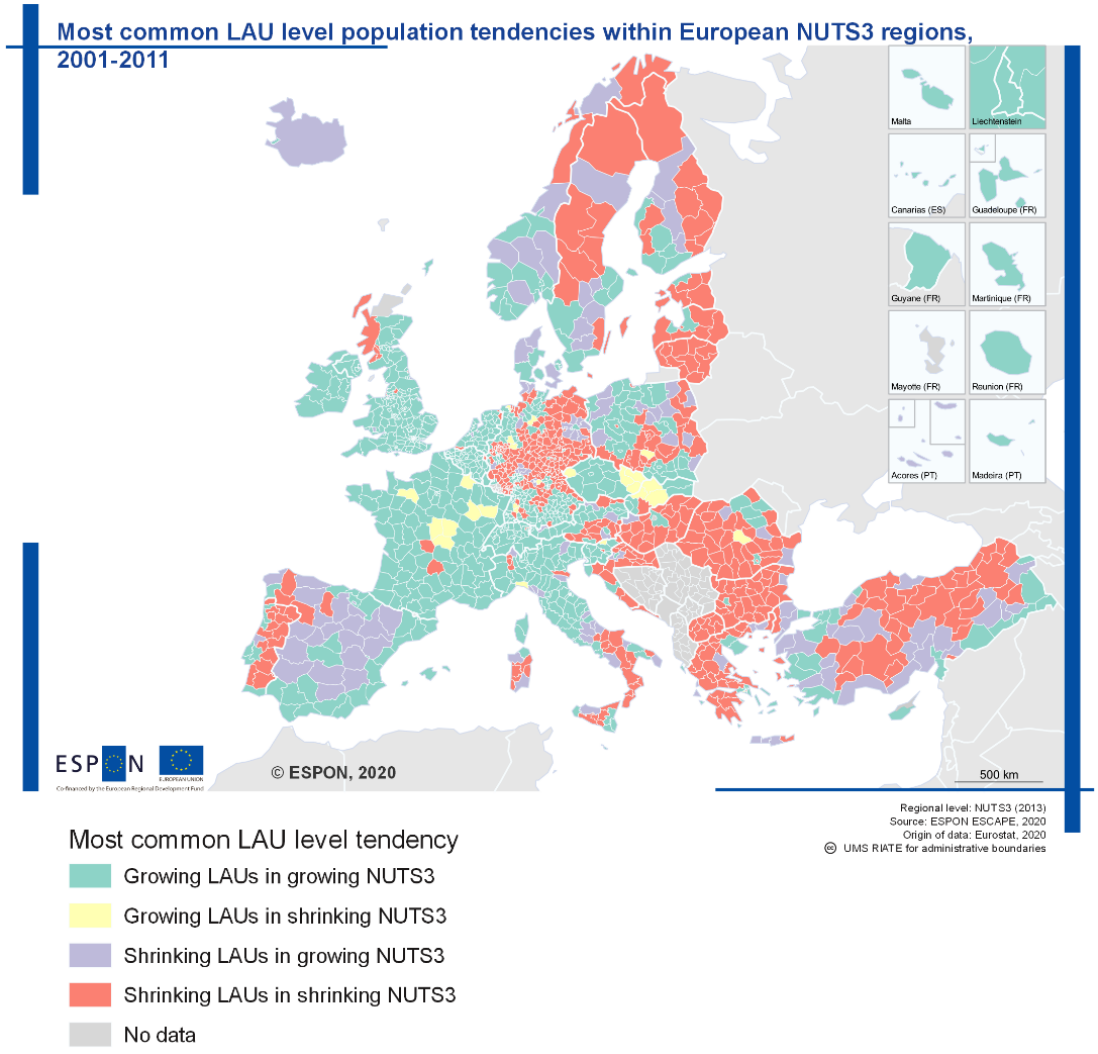
important in Eastern Germany and many (usually peripheral) parts of Greece, Italy, Spain, Portugal, and the Nordic countries. These measures also underline the diversity of demographic processes affecting different levels of the settlement structure. The map on the share of shrinking LAUs shades the above mentioned patterns by drawing attention to the higher number of territorial units with population decrease among NUTS3 regions having many shrinking LAUs with smaller population size (e.g. in Spain and Poland), and vice-versa – a more significant depopulation of LAUs with higher population share (e.g. in France) (Map 9).

Map 9: Share of shrinking LAU units within European NUTS3 regions, 2001-2011



Finally, the diversity among LAU units regarding their demographic tendencies might also cause a mismatch between the prevailing trend at LAU level and the trends observed at NUTS3 level. While the most common region types are shrinking NUTS3 with a high share of shrinking LAUs and growing NUTS3 with a high share of growing LAUs, a notable number of exceptions are situated in Spain, the Nordic countries, Poland or Germany – a high share of shrinking LAUs in growing NUTS3 (Map 10). There are also cases (e.g. in France, Czechia, and Slovakia), where growing LAUs are overrepresented within shrinking NUTS3 regions; this can be the case of LAUs with shrinking cities and growing rural LAUs.

Map 10: Most common LAU level population tendencies within European NUTS3 regions, 2001-2011



2 Rural areas left behind: measuring, mapping, and classifying "complex shrinking"

This chapter provides background information on the creation of the typology of "complex shrinking" presented in Chapter 4 of the ESCAPE Final Report. After presenting the background, it contains a detailed overview of the variables used in the clustering algorithm or considered for this purpose; of the clustering method, including data preparation; of the different cluster solutions considered; and of the process to identify appropriate labels for the final cluster partition.

2.1 Objectives and theoretical background

"Shrinking regions" face challenges that are not simply the one of depopulation, but span topics such as the levels of economic activity and employment, sectoral structures, productivity, innovation, social capital, institutions, and governance capacity. While "simple shrinking" is relatively easily measured, "complex shrinking" is *a multi-faceted syndrome of decline, often but not necessarily leading to "vicious cycles" which tend to be self-perpetuating*.

The objective of the analysis presented in this Annex is to define a territorial (NUTS3) typology of "complex shrinking" by critically applying hierarchical clustering algorithms to a set of variables relevant with respect to the above understanding of "complex shrinking". Clustering methods are not meant to identify causal relationships, and the current data availability (in particular the length of the time series), except for demographic variables, would not allow to test for such effects. Hence, the choice of variables was aimed at elaborating a *simplified*, *descriptive* typology of the complex and interrelated economic, demographic, and land-related dynamics embedded in the diverse geographical structure of shrinking rural and intermediate regions. Clustering algorithms capture common patterns of variation between variables, and minimise the difference within groups of units while maximising the difference between them. Ideally, this exercise should allow to identify a limited number of groups of shirking regions characterised by compact sets of economic, demographic, and land-related dynamics generally observed jointly. Due to data constraints (even a single missing variable would cause a NUTS3 region to be excluded from the procedure), our analysis is restricted to the 385 EU28 predominantly rural and intermediate NUTS3 (2013) regions identified as "shrinking" in the ESCAPE structural typology of "simple shrinking" (for which the number of missing variables is limited, differently from non-EU European countries). An overview of the main demographic and geographical characteristics of this group of regions is provided in Table 4.

Although our analysis is data driven, we were guided by specific theoretical premises. In particular, our choice of the variables is inspired by development economics models elaborated to study migration and labour-allocation patterns, namely the dual economy model by Lewis (1954); the neoclassical migration model by Schultz (1964); and its revision by Harris and Todaro (1970). The Lewis model assumes that surplus labour in the agricultural (rural) sector moves to the modern (urban) sector driven by the availability of jobs. The Schultz model

postulates that migration is primarily driven by the intersectoral wage differentials, with distance (accessibility) affecting migration costs, and thus the relative payoffs of different decisions. Todaro argues that the *expected* income in different locations matters most. Since we work with variables aggregated at territorial level, more recent models based on micro-behaviours are not appropriate here.

Table 4. Population and geography of the NUTS3 regions used in the analysis of "complex shrinking", compared to all the EU28 regions.

Regional characteristics	**NUTS3 regions used in the analysis**	**All EU28 NUTS3 regions**
Number of NUTS3	385 (28.7%)	1,342
Area (sq. km)	1,764,511 (39.4%)	4,473,673
Population (2016)	90,184,504 (17.7%)	508,486,885
Population change (2001-2016)[1]	-7.36	4.37
Island regions (%)	2.86	5.29
Metropolitan regions (%)	12.47	31.30
Capital metro regions (%)	1.30	8.05
Post-socialist regions (%)	47.01	23.47
Coastal population 2016 (%)[1]	18.31	37.86
Regions with mountain area >50% (%)	20.78	12.97
Regions with mountain pop. >50% (%)	31.69	23.70
Border regions (%)	46.75	34.03
External border regions (%)	16.88	9.63
[1] Calculated on the overall population of the regions (not as an average).		

Our hypothesis is that changes in population are related to local economic conditions relatively to other regions, primarily in the same country, through migration (but also fertility rates). People move toward (and have children) where wages – here exemplified by the value-added per working unit – are relatively higher. In a situation of economic restructuring, there is a progressive movement of labour from low-productivity agriculture to the industrial and tertiary sectors, while deindustrialisation and automation cause a reduction of industrial employment to the benefit of services (or other regions), and state withdrawal results in a shrinking of the public sector. Thus, there are movements both between territories and between sectors, driven by their relative competitiveness, and expansion or recession. The payments of the EU CAP and the EU Cohesion Policy can act as a counteracting force in disadvantaged territories, and need thus to be considered in the analysis. Diverse land uses (abandonment of agricultural land, building of new residential area, erosion) are an outcome of these movements. The geographical nature of a region (mountain, island), its location (border) and accessibility, and its history (post-socialist) act as additional constraints or resources. Finally, the internal distribution of the population allows to detect situations where shrinking coexists with economic dynamism.

It is important to point out that the exclusion of growing NUTS3 regions from the analysis means that the distribution of most variables is truncated; hence, there is limited scope to detect the economic, geographical, and environmental *causes* of shrinking – as we lack a counterfactual.

Although our narration is underpinned by a causal theoretical model, the output of the cluster analysis is rather used to “make order” in the *description* of the complexity of shrinking.

2.2 Overview of the variables

This section provides an overview of the variables considered for the cluster analysis. The final clustering algorithm was applied to the 29 variables highlighted in dark grey in Table 5. Some of the variables in the initial list were excluded due to the large number of missing. In particular, the economic variables for GVA, employment and productivity in the service and public sectors were not used in the cluster analysis due to missing data on France, Poland, and Estonia for many years, and because rural shrinking is more likely to be related to economic developments in the primary and secondary sectors. Other variables, particularly those related to geographical characteristics (and including territorial dummies), were excluded because we wanted relevant underlying geographical constraints and cleavages to emerge endogenously through the clustering of socio-economic and demographic indicators, instead of imposing them *a priori*.

Most variables are provided by Eurostat, and are measured at NUTS3 level. However, for some indicators that we deemed relevant and for which no NUTS3 level measurement was available, we assigned to each NUTS3 region the value of its NUTS2 region of belonging (this is specified in the descriptions of the variables in Table 3).

All variables refer to the year 2016, which is the ending year for the construction of the structural typology of “simple shrinking” (based on natural change and net migration), or to the latest available year before 2016 (e.g., 2011 for the variables calculated at the level of Local Administrative Units). Equally, the variables measuring change refer to the period 2001-2016, which is again the period considered in the construction of the structural typology of “simple shrinking”, or to the longest available period included within it. The only exception in this regard is the chronological typology of “simple shrinking”, which is measured from 1993 to 2003.

Table 5. Full list of variables related to "complex shrinking" (synthetic statistical measures).

Category	Variable name	Variable description	Obs.	Mean	Std. dev.	Min	Max	Used
Geography (territory)	deg_urb	Degree of urbanisation (rural vs. intermediate)	385	0.56	0.50	0.00	1.00	No
	metro_region	Dummy for metropolitan regions (capital and other)	385	0.12	0.33	0.00	1.00	No
	capital_metro	Dummy for metropolitan capital regions	385	0.01	0.11	0.00	1.00	No
	post_socialist	Dummy for post-socialist regions (with East Germany)	385	0.47	0.50	0.00	1.00	No
	ISLAND	Island region (1 = minor island; 5 = major island)	385	0.12	0.74	0.00	5.00	No
	COASTAL_share	Percent of population living in coastal areas	384	18.46	37.07	0.00	100.00	No
	mountain_area	Dummy for regions with mountain area >50%	385	0.21	0.41	0.00	1.00	No
	mountain_pop	Dummy for regions with mountain population >50%	385	0.32	0.47	0.00	1.00	No
	border_region	Dummy for border regions (or regions at <25 km from a border, internal or external)	385	0.47	0.50	0.00	1.00	No
	external_border	Dummy for external border regions (or regions at <25 km from an EU external border)	385	0.17	0.38	0.00	1.00	No
	MM_Ind_2014	Multimodal accessibility index (2014)	383	71.45	30.07	22.13	144.46	Yes
	access_ch_00_14	Change in the multimodal accessibility index (2000-2014)	383	26.62	18.56	-36.40	117.06	Yes
Geography (macro-region)	Eastern_Europe	Dummy for Eastern European regions	385	0.38	0.49	0.00	1.00	No
	Central_Europe	Dummy for Central European regions	385	0.40	0.49	0.00	1.00	No
	Northern_Europe	Dummy for Northern European regions	385	0.04	0.19	0.00	1.00	No
	Southern_Europe	Dummy for Southern European regions	385	0.18	0.39	0.00	1.00	No
	outermost	Dummy for outermost regions	385	0.01	0.07	0.00	1.00	No
Demography (population distribution)	Gini_2011	Concentration of population (0-1) between LAUs (2011)	385	0.51	0.19	0.00	0.89	Yes
	change_Gini	Change in concentration of population between LAUs (2001-2011)	385	0.01	0.02	-0.02	0.08	Yes
	nuts3_shrink_gap	Intensity of shrinking at LAU level (from poverty intensity) (2001-2011)	385	0.06	0.04	0.00	0.21	No

	nuts3_st_dev	Standard deviation of rate of shrinking between LAUs (2001-2011)	385	0.07	0.07	0.00	0.74	No
	share_shrinking	Share of population living in LAUs that were shrinking in 2001-2011 (2011)	385	0.76	0.22	0.00	1.00	Yes
	pop_density	Population density (2016)	385	123.62	191.91	1.83	1,755.49	Yes
	POP16_64_share_16	Share of working age population 16-64 (2016)	385	0.64	0.03	0.53	0.70	Yes
Demography (population change)	rate_shr_01_16	Rate of shrinking from 2001 to 2016 as a percent of the 2016 population	385	-8.61	8.07	-41.82	-0.02	No
	nat_ch_01_16	Rate of natural change from 2001 to 2016 as a percent of the 2016 population	385	-5.88	4.34	-26.26	8.68	Yes
	net_mig_01_16	Rate of net migration from 2001 to 2016 as a percent of the 2016 population	385	-2.72	5.99	-27.21	8.73	Yes
	pop_change_93_33	Yearly rate of population change from 1993 to 2033 as a share of the 1993 population	385	-0.60	0.48	-2.72	0.15	No
	pop_change_93_13	Yearly rate of population change from 1993 to 2013 as a share of the 1993 population	385	-0.46	0.54	-4.91	0.67	Yes
	pop_change_13_33	Yearly rate of population change from 2013 to 2033 as a share of the 2013 population	385	-0.74	0.52	-2.83	0.30	Yes
	decad_shrink	Number of decades of shrinking from LAU data (1961-2011)	385	2.79	1.34	0.00	5.00	Yes
Economy (GVA by macro-sector[1])	GVAAshare2016	Share of GVA produced by sector A in 2016	385	0.05	0.04	0.00	0.24	Yes
	GVABFshare2016	Share of GVA produced by sectors B-F in 2016	385	0.33	0.10	0.06	0.67	Yes
	GVAGNshare2016	Share of GVA produced by sectors G-N in 2016	385	0.39	0.06	0.21	0.66	Yes
	GVAOUshare2016	Share of GVA produced by sectors O-U in 2016	385	0.23	0.07	0.08	0.47	Yes
	GVAArelch	Relative change in the share of GVA generated by the A sector (2001-2016)	385	-0.26	0.36	-0.99	4.54	Yes
	GVABFrelch	Relative change in the share of GVA generated by the B-F sectors (2001-2016)	385	0.03	0.23	-0.42	1.33	Yes
	GVAGNrelch	Relative change in the share of GVA generated by the G-N sectors (2001-2016)	362	0.05	0.16	-0.32	0.96	No

	GVAOUrelch	Relative change in the share of GVA generated by the O-U sectors (2001-2016)	362	0.10	0.19	-0.38	0.85	No
Economy (employment by macro-sector[1])	EMPAshare2016	Share of employment in sector A in 2016	385	0.12	0.12	0.00	0.62	No
	EMPBFshare2016	Share of employment in sectors B-F in 2016	385	0.28	0.09	0.10	0.51	No
	EMPGNshare2016	Share of employment in sectors G-N in 2016	382	0.33	0.07	0.11	0.61	No
	EMPOUshare2016	Share of employment in sectors O-U in 2016	385	0.28	0.08	0.08	0.51	No
	EMPArelch	Relative change in the share of employment in the A sector (2001-2016)	385	-0.22	0.28	-0.70	2.53	Yes
	EMPBFrelch	Relative change in the share of employment in the B-F sectors (2001-2016)	385	-0.06	0.18	-0.44	0.82	Yes
	EMPGNrelch	Relative change in the share of employment in the G-N sectors (2001-2016)	368	0.19	0.20	-0.18	1.06	No
	EMPOUrelch	Relative change in the share of employment in the O-U sectors (2001-2016)	371	0.17	0.26	-0.41	1.45	No
Economy (GVA per working unit by macro-sector[1])	prod_relnat2016	GVA per working unit as a percent of the national level in 2016	385	84.34	12.99	38.22	142.87	Yes
	prodA_relnat2016	GVA per working unit in sector A as a percent of the national level in 2016	385	112.48	55.34	4.41	512.31	Yes
	prodBF_relnat2016	GVA per working unit in sectors B-E as a percent of the national level in 2016	385	86.75	25.74	42.10	340.85	Yes
	prodGN_relnat2016	GVA per working unit in sectors G-N as a percent of the national level in 2016	382	85.34	13.37	54.70	172.49	No
	prodOU_relnat2016	GVA per working unit in sectors O-U as a percent of the national level in 2016	385	92.49	10.09	47.94	130.35	No
	ConvAbsNatProd	Convergence to the national GVA per w. u. (absolute percent points, 2001-2016)	385	-1.09	10.76	-49.45	38.26	Yes
	ConvAbsNatProdA	Convergence to the national GVA per w. u. in sector A (absolute percent points, 2001-2016)	385	3.72	50.19	-255.16	362.47	Yes
	ConvAbsNatProdBF	Convergence to the national GVA per w. u. in sectors B-F (absolute percent points, 2001-2016)	385	-1.71	18.67	-66.98	102.40	Yes
	ConvAbsNatProdGN	Convergence to the national GVA per w. u. in sectors G-N (absolute percent points, 2001-2016)	345	-2.75	16.23	-66.54	73.05	No

	ConvAbsNatProdOU	Convergence to the national GVA per w. u. in sectors O-U (absolute percent points, 2001-2016)	348	-0.20	10.70	-45.57	47.52	No
Economy (GDP and investments)	GDPpc_PPS2016	GDP per capita (Purchasing Power Standards) in 2016	385	21,038.51	9,363.48	6,500.00	94,700.00	Yes
	GDPrel_PPS2016	GDP per capita (PPS) as a percent of the EU GDP per capita (PPS) in 2016	385	71.80	31.96	22.18	323.21	No
	GDPrelnat_PPS2016	GDP per capita (PPS) as a percent of the national GDP per capita (PPS) in 2016	385	76.34	19.63	41.87	260.88	No
	convergEU_abs	Convergence to the EU GDP per capita (absolute percent points, 2001-2016)	384	4.88	13.94	-28.49	101.48	Yes
	convergNat_abs	Convergence to the national GDP per capita (absolute percent points, 2001-2016)	384	-1.30	10.96	-43.86	79.03	Yes
	invest_on_gdp	Investments (gross fixed capital formation) as a share of the GDP at NUTS2 level (2016)	385	0.20	0.03	0.12	0.28	No
Environment (land use and soil erosion)	agri_land_2015	Percent of land used for agriculture and related activities at NUTS2 level (2015)	383	79.40	10.89	21.00	95.30	No
	builtup_land_2015	Percent of land used for services and residential areas at NUTS2 level (2015)	383	5.93	4.21	0.90	43.30	No
	unused_land_2015	Percent of unused and abandoned land at NUTS2 level (2015)	383	10.94	11.15	1.00	73.70	No
	erosion2016	Rate of soil erosion (t/ha) (2016)	383	4.00	4.78	0.10	35.60	No
	change_agri_land	Change in the percent of land used for agriculture and related activities at NUTS2 level (absolute points, 2012-2015)	368	-1.19	2.44	-21.80	4.60	No
	change_builtup_land	Change in the percent of land used for services and residential areas at NUTS2 level (absolute points, 2012-2015)	368	0.45	1.28	-4.30	4.40	No
	change_unused_land	Change in the percent of unused and abandoned land at NUTS2 level (absolute points, 2012-2015)	368	0.56	2.27	-4.10	20.80	No
	erosion_ch	Change in the rate of soil erosion (t/ha) (2000-2016)	383	-0.50	0.61	-3.90	2.50	No
Policy	paymentCF	Cumulated payments from Cohesion Fund per capita at NUTS2 level (2000-2013)	385	322.01	424.29	0.00	1,575.28	No

(EU funds)	paymentEAFRD	Cumulated payments from EAFRD per capita at NUTS2 level (2000-2013)	385	395.25	295.47	0.00	1,326.14	No
	paymentERDF	Cumulated payments from ERDF per capita at NUTS2 level (2000-2013)	385	1,031.41	1,064.61	19.72	7,250.47	No
	paymentESF	Cumulated payments from ESF per capita at NUTS2 level (2000-2013)	385	407.48	392.87	29.99	2,403.27	No
[1] Based on NACE rev.2 categorisation: primary (A); secondary (B-F); tertiary (G-N); and public (O-U).								

A detailed overview of the variables used, or considered, for the construction of the complex shrinking typology, which includes descriptive analyses with meta-information, source description, and methodological comments, can be read below.

Geography	
Geographical characteristics	
Short variable name	nuts2013_degurb
Long variable name	Degree of urbanisation (intermediate or rural)
Abstract	The urban-rural typology is applied to NUTS level 3 regions: it identifies three types of region based on the share of the rural population, namely: predominantly rural regions, intermediate regions, and predominantly urban regions.
Years available	2013
Methodology description	
Source	Eurostat
Reference	Overview of the urban/rural type for each NUTS3 region (based on the 2013 NUTS version and 2010 Geostat population grid)
Publication title	
URL	https://ec.europa.eu/eurostat/documents/35209/35256/Urban-rural-typology-NUTS-2013.xls
Used in cluster analysis	NO

Geography	
Geographical characteristics	
Short variable name	ISLAND
Long variable name	Island regions
Abstract	The island typology is applied at the level of NUTS regions. Island regions are defined as NUTS level 3 regions within the European Union (EU) that are entirely composed of one or more islands.
Years available	2013
Methodology description	The categories are: 1: major island < 50,000 inhabitants 2: major island between 50,000 and 100,000 inhabitants 3: major island between 100,000 and 250,000 inhabitants 4: island with 250,000 - 1 million inhabitants 5: island with >= 1 million inhabitants
Source	DG REGIO
Reference	Table of the NUTS classification (v. 2013) containing items describing territorial typologies and characteristics
Publication title	
URL	
Used in cluster analysis	NO

Geography	
Geographical characteristics	
Short variable name	metro_region
Long variable name	Dummy for metropolitan regions (capital and not capital)
Abstract	The metropolitan typology is applied at the level of NUTS level 3 regions and identifies metropolitan regions in the European Union (EU). These regions are defined as urban agglomerations (NUTS level 3 regions or groups of NUTS level 3 regions) where at least 50% of the population lives inside a functional urban area (FUA) that is composed of at least 250,000 inhabitants.
Years available	2013
Methodology description	
Source	Eurostat
Reference	Complete list of metro-regions (based on the 2013 NUTS version and 2010 Geostat population grid)
Publication title	
URL	https://ec.europa.eu/eurostat/documents/4313761/4311719/Metropolitan-region-typology-NUTS-2013.xlsx
Used in cluster analysis	NO

Geography	
Geographical characteristics	
Short variable name	capital_metro
Long variable name	Dummy for metropolitan capital regions
Abstract	The metropolitan typology is applied at the level of NUTS level 3 regions and identifies metropolitan regions in the European Union (EU). These regions are defined as urban agglomerations (NUTS level 3 regions or groups of NUTS level 3 regions) where at least 50% of the population lives inside a functional urban area (FUA) that is composed of at least 250,000 inhabitants.
Years available	2013
Methodology description	Only capital metropolitan regions are taken into account
Source	Eurostat
Reference	Complete list of metro-regions (based on the 2013 NUTS version and 2010 Geostat population grid)
Publication title	
URL	https://ec.europa.eu/eurostat/documents/4313761/4311719/Metropolitan-region-typology-NUTS-2013.xlsx
Used in cluster analysis	NO

Geography	
Geographical characteristics	
Short variable name	COASTAL_share
Long variable name	Percentage of population living in coastal areas
Abstract	The coastal typology is applied at the level of NUTS level 3 regions: it identifies coastal regions in the European Union (EU) as having a border with a coastline, having more than half of their population within 50 km of the coastline, or having a strong maritime influence.
Years available	2013
Methodology description	
Source	Eurostat
Reference	Full list of coastal regions (based on NUTS version 2013 and Geostat population grid 2011)
Publication title	
URL	https://ec.europa.eu/eurostat/documents/1797762/1797951/Coastal-noncoastal-typology-NUTS-2013.xlsx
Used in cluster analysis	NO

Geography	
Geographical characteristics	
Short variable name	mountain_area
Long variable name	Dummy for regions with mountain area >50%
Abstract	The mountain typology is applied at the level of NUTS level 3 regions: it identifies mountain regions in the European Union (EU) as NUTS level 3 regions where more than half of the surface is covered by mountain areas (category 2), or more than half of the population lives in mountain areas (category 1), or both (category 3). This specific variable identifies NUTS level 3 regions where more than half of the surface is covered by mountain areas.
Years available	2013
Methodology description	Typology categories 2 and 3 are taken into account
Source	DG REGIO
Reference	Table of the NUTS classification (v. 2013) containing items describing territorial typologies and characteristics
Publication title	
URL	
Used in cluster analysis	NO

Geography	
Geographical characteristics	
Short variable name	mountain_pop
Long variable name	Dummy for regions with mountain population >50%
Abstract	The mountain typology is applied at the level of NUTS level 3 regions: it identifies mountain regions in the European Union (EU) as NUTS level 3 regions where more than half of the surface is covered by mountain areas (category 2), or more than half of the population lives in mountain areas (category 1), or both (category 3). This specific variable identifies NUTS level 3 regions where more than half of the surface population lives in mountain areas.
Years available	2013
Methodology description	Typology categories 1 and 3 are taken into account
Source	DG REGIO
Reference	Table of the NUTS classification (v. 2013) containing items describing territorial typologies and characteristics
Publication title	
URL	
Used in cluster analysis	NO

Geography	
Geographical characteristics	
Short variable name	post_socialist
Long variable name	Dummy for post-socialist regions
Abstract	In this typology, besides NUTS3 regions of BG, CZ, EE, HR, HU, LT, LV, PL, RO, SI and SK, regions of the former German Democratic Republic are taken into account.
Years available	2020
Methodology description	
Source	ESPON ESCAPE
Reference	
Publication title	
URL	
Used in cluster analysis	NO

Geography	
Geographical characteristics	
Short variable name	border_region
Long variable name	Dummy for border regions (or regions at <25 km from a border, internal or external)
Abstract	The border typology is applied at the level of NUTS level 3 regions: it identifies border regions in the European Union (EU) as those regions with a land border, or those regions where more than half of the population lives within 25 km of such a border.
Years available	2013
Methodology description	Map for NUTS 2016 border regions (https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:CH08M01_TT2018.png) was manually reviewed for NUTS 2013.
Source	Eurostat
Reference	Territorial typologies manual - border regions
Publication title	
URL	https://ec.europa.eu/eurostat/statistics-explained/index.php/Territorial_typologies_manual_-_border_regions
Used in cluster analysis	NO

Geography	
Geographical characteristics	
Short variable name	external_border
Long variable name	Dummy for EU external border regions (or regions at <25 km from an EU external border)
Abstract	The border typology is applied at the level of NUTS level 3 regions: it identifies border regions in the European Union (EU) as those regions with a land border, or those regions where more than half of the population lives within 25 km of such a border.
Years available	2013
Methodology description	Map for NUTS 2016 border regions (https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:CH08M01_TT2018.png) was manually reviewed for NUTS 2013. Only EU external borders are taken into account
Source	Eurostat
Reference	Territorial typologies manual - border regions
Publication title	
URL	https://ec.europa.eu/eurostat/statistics-explained/index.php/Territorial_typologies_manual_-_border_regions
Used in cluster analysis	NO

Geography	
Geographical characteristics	
Short variable name	access_ch_00_14
Long variable name	Change in the multimodal accessibility index (2000-2014)
Abstract	For each NUTS3 region the population in all destination regions is weighted by the travel time to go there. The weighted population is summed up to the indicator value for the accessibility potential of the origin region. All indicator values are expressed as index, i.e. related to the ESPON average. The indicator gives the relative change of the accessibility potential between two points in time.
Years available	2000-2014
Methodology description	Output of S&W Accessibility model. In the few cases (in Portugal and Slovenia) of NUTS3 changes from 2010 to 2013, the new accessibility indexes were calculated as weighted averages using the regional surfaces as weights; this relies on the assumption that the new NUTS3 region are characterised by an accessibility similar to their predecessor regions.
Source	S&W Spiekermann & Wegener, Urban and Regional Research
Reference	ESPON MATRICES
Publication title	ESPON MATRICES Final Report
URL	http://projects.mcrit.com/esponDB/index.php/main-data
Used in cluster analysis	YES

Geography	
Geographical characteristics	
Short variable name	MM_Ind_2014
Long variable name	Multimodal accessibility index (2014)
Abstract	For each NUTS3 region the population in all destination regions is weighted by the travel time to go there. The weighted population is summed up to the indicator value for the accessibility potential of the origin region. All indicator values are expressed as index, i.e. related to the ESPON average.
Years available	2014
Methodology description	Output of S&W Accessibility model. In the few cases (in Portugal and Slovenia) of NUTS3 changes from 2010 to 2013, the new accessibility indexes were calculated as weighted averages using the regional surfaces as weights; this relies on the assumption that the new NUTS3 region are characterised by an accessibility similar to their predecessor regions.
Source	S&W Spiekermann & Wegener, Urban and Regional Research
Reference	ESPON MATRICES
Publication title	ESPON MATRICES Final Report
URL	http://projects.mcrit.com/esponDB/index.php/main-data
Used in cluster analysis	YES

Demography	
Internal population distribution	
Short variable name	Gini_2011
Long variable name	Concentration of population (0-1) between LAUs (2011)
Abstract	For each NUTS3 region, a Gini index is calculated, where the single LAUs represent the units, and the population of these LAUs represents the variable of interest. The concentration index varies between 0 (equal distribution, or a single LAU in the NUTS3) and 1 (maximum concentration, i.e. all population in a single LAU and zero population in the others).
Years available	2011
Methodology description	$G_i = \frac{2*\sum_{l=1}^{n} l*Pop_{l(2011)}}{n*\sum_{l=1}^{n} Pop_{l(2011)}} - \frac{n+1}{n}$, where *i* denotes a NUTS3 region and in each region *i*, *n* denotes the number of LAUs, *l* the progressive order of the LAUs by population, and Pop_l the LAU population
Source	DG REGIO, Eurostat
Reference	Historical Population Data from 1961 to 2011
Publication title	Population Data Collection for European Local Administrative Units from 1960 onwards. Final Report
URL	https://ec.europa.eu/eurostat/web/nuts/local-administrative-units
Used in cluster analysis	YES

Demography	
Internal population distribution	
Short variable name	change_Gini
Long variable name	Change in concentration of population between LAUs (2001-2011)
Abstract	For each NUTS3 region, a Gini index is calculated, where the single LAUs represent the units, and the population of these LAUs represents the variable of interest. The concentration index varies between 0 (equal distribution, or a single LAU in the NUTS3) and 1 (maximum concentration, i.e. all population in a single LAU and zero population in the others). This variable represents the variation in the Gini index between 2001 and 2011.
Years available	2001, 2011
Methodology description	$G_{i(2011)} - G_{i(2001)}$, where *i* denotes a NUTS3 region
Source	DG REGIO, Eurostat
Reference	Historical Population Data from 1961 to 2011
Publication title	Population Data Collection for European Local Administrative Units from 1960 onwards. Final Report
URL	https://ec.europa.eu/eurostat/web/nuts/local-administrative-units
Used in cluster analysis	YES

Demography	
Internal population distribution	
Short variable name	nuts3_shrink_gap
Long variable name	Intensity of shrinking at LAU level (from poverty intensity) (2001-2011)
Abstract	This index, inspired by the poverty intensity index, measures the severity of shrinking at LAU level compared to a threshold of zero population change in each NUTS3 region. It represents a weighted average of the LAU level (absolute) rate of shrinking in 2001-2011, with weights equal to the final population of each LAU, and rate of shrinking equal to zero for all growing LAUs.
Years available	2001, 2011
Methodology description	$\left\lvert \frac{\sum_{k=1}^{K} \Delta Pop_{k(2001,2011)} * Pop_{k(2011)}}{Pop_{i(2011)}} \right\rvert$ (inspired by the "poverty gap index"), where *i* denotes a NUTS3 region and, in each region *i*, *k* denotes the shrinking LAUs, ΔPop_k the relative shrinking rate of each shrinking LAU, Pop_k the population of LAU *k*, and Pop_i the total population of region *i*
Source	DG REGIO, Eurostat
Reference	Historical Population Data from 1961 to 2011
Publication title	Population Data Collection for European Local Administrative Units from 1960 onwards. Final Report
URL	https://ec.europa.eu/eurostat/web/nuts/local-administrative-units
Used in cluster analysis	NO

Demography	
Internal population distribution	
Short variable name	nuts3_st_dev
Long variable name	Standard deviation of rate of shrinking between LAUs (2001-2011)
Abstract	For each NUTS3 region, the standard deviation of the rate of population change (2001-2011) in all LAUs compared to the NUTS3 level rate of population change is calculated; each LAU's rate of population change is weighted by the final population of the LAU.
Years available	2001, 2011
Methodology description	$\sqrt{\frac{\sum_{l=1}^{n} Pop_{l(2011)} * \left(\Delta Pop_{l(2001,2011)} - \frac{\sum_{l=1}^{n} \Delta Pop_{l(2001,2011)} * Pop_{l(2011)}}{Pop_{i(2011)}} \right)^2}{Pop_{i(2011)}}}$, where *i* denotes a NUTS3 region and, in each region *i*, *l* denotes the LAUs, *n* the total number of LAUs, ΔPop_l the relative shrinking rate of each LAU, Pop_l the population of LAU *l*, and Pop_i the total population of region *i*
Source	DG REGIO, Eurostat
Reference	Historical Population Data from 1961 to 2011
Publication title	Population Data Collection for European Local Administrative Units from 1960 onwards. Final Report
URL	https://ec.europa.eu/eurostat/web/nuts/local-administrative-units
Used in cluster analysis	NO

Demography	
Internal population distribution	
Short variable name	share_shrinking
Long variable name	Share of population living in LAUs that were shrinking in 2001-2011 (2011)
Abstract	The share of 2011 population living in shrinking LAUs refers to the ratio of the number of population within a NUTS3 region living in LAU units with population decrease between 2001 and 2011 and the total population of the NUTS3 region.
Years available	2011
Methodology description	$\frac{\sum_{k=1}^{K} Pop_{k(2011)}}{Pop_{i(2011)}}$, where, for each NUTS3 region *i*, *k* denotes the shrinking LAUs, Pop_k the population of each shrinking LAUs, and Pop_i the total population of NUTS3 region i
Source	DG REGIO, Eurostat
Reference	Historical Population Data from 1961 to 2011
Publication title	Population Data Collection for European Local Administrative Units from 1960 onwards. Final Report
URL	https://ec.europa.eu/eurostat/web/nuts/local-administrative-units
Used in cluster analysis	YES

Demography	
Internal population distribution	
Short variable name	pop_density
Long variable name	Population density (2016)
Abstract	Population density is the ratio of the (annual average) population of a region to the (land) area of the region; total area (including inland waters) is used when land area is not available.
Years available	2016
Methodology description	$Total\ population_{i(2016)}$ / $Area_{i(2016)}$, where *i* denotes a NUTS3 region. Eurostat dataset was complemented by ESPON data sources and own calculations (see simple shrinking data description). NUTS 2016 data was manually converted to NUTS 2013, where NUTS changes between 2013 and 2016 occurred
Source	Eurostat, ESPON ECAPE
Reference	Area by NUTS3 region (reg_area3), the 2016 population is from the population dataset used in the typology of simple shrinking
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Demography	
Internal population distribution	
Short variable name	POP16_64_share_16
Long variable name	Share of working age population 16-64 (2016)
Abstract	The share of working age population refers to the ratio of 15-64 years old population on the total number of population.
Years available	2016
Methodology description	$Population_{i16\text{-}64(2016)}$ / $Total\ population_{i(2016)}$, where *i* denotes a NUTS3 region. Eurostat dataset was complemented by ESPON data sources and own calculations (see simple shrinking data description). NUTS 2016 data was manually converted to NUTS 2013, where NUTS changes between 2013 and 2016 occurred
Source	Eurostat
Reference	Population on 1 January by broad age group, sex and NUTS3 region (demo_r_pjanaggr3)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Demography	
Demographic change (simple shrinking typology)	
Short variable name	rate_shr_01_16
Long variable name	Rate of shrinking from 2001 to 2016 as a percentage of the 2016 population
Abstract	Rate of shrinking is the difference between total population numbers in 2016 and 2001, expressed as the ratio (percentage) compared to the total number of population in the ending year of the given period (2016).
Years available	2001-2016
Methodology description	$Total\ population\ change_{i(2001\text{-}2016)}$ / $Population_{i(2016)}$ * 100, where *i* denotes a NUTS3 region. Eurostat dataset was complemented by ESPON data sources and own calculations (see simple shrinking data description). NUTS 2016 data was manually converted to NUTS 2013, where NUTS changes between 2013 and 2016 occurred
Source	Eurostat
Reference	Population change - Demographic balance and crude rates at regional level (NUTS3) [demo_r_gind3]
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Demography	
Demographic change (simple shrinking typology)	
Short variable name	nat_ch_01_16
Long variable name	Rate of natural change from 2001 to 2016 as a percentage of the 2016 population
Abstract	The rate of natural change is the difference between the number of live births and the number of deaths from a given region during a period, expressed as the ratio (percentage) compared to the total number of population in the ending year of the period (2016).
Years available	2001-2016
Methodology description	*Natural change of population$_{i(2001-2016)}$ / Population$_{i(2016)}$ * 100,* where *i* denotes a NUTS3 region. Eurostat dataset was complemented by ESPON data sources and own calculations (see simple shrinking data description). NUTS 2016 data was manually converted to NUTS 2013, where NUTS changes between 2013 and 2016 occurred
Source	Eurostat
Reference	Population change - Demographic balance and crude rates at regional level (NUTS3) [demo_r_gind3]
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Demography	
Demographic change (simple shrinking typology)	
Short variable name	net_mig_01_16
Long variable name	Rate of net migration from 2001 to 2016 as a percentage of the 2016 population
Abstract	Net migration rate is the difference between the number of immigrants and the number of emigrants from a given region during a period, expressed as the ratio (percentage) compared to the total number of population in the ending year of the period (2016).
Years available	2001-2016
Methodology description	*Net migration$_{i(2001-2016)}$ / Population$_{i(2016)}$ * 100,* where *i* denotes a NUTS3 region. Eurostat dataset was complemented by ESPON data sources and own calculations (see simple shrinking data description. NUTS 2016 data was manually converted to NUTS 2013, where NUTS changes between 2013 and 2016 occurred
Source	Eurostat
Reference	Population change - Demographic balance and crude rates at regional level (NUTS3) [demo_r_gind3]
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Demography	
Demographic change (simple shrinking typology)	
Short variable name	pop_change_93_33
Long variable name	Yearly rate of population change from 1993 to 2033 as a share of the 1993 population
Abstract	Yearly rate of population change from 1993 to 2033 is the average yearly population change based on the difference between the projected total population numbers in 2033 and the population in 1993, expressed as the ratio (percentage) compared to the total number of population in the starting year of the given period (1993).
Years available	1993-2033
Methodology description	$((Population_{i(2033)}/Population_{i(1993)})^{1/40} - 1) * 100$, where *i* denotes a NUTS3 region
Source	ESPON ESCAPE
Reference	
Publication title	
URL	
Used in cluster analysis	NO

Demography	
Demographic change (simple shrinking typology)	
Short variable name	pop_change_93_13
Long variable name	Yearly rate of population change from 1993 to 2013 as a share of the 1993 population
Abstract	Yearly rate of population change from 1993 to 2013 is the average yearly population change based on the difference between the total population numbers in 2013 and 1993, expressed as the ratio (percentage) compared to the total number of population in the starting year of the given period (1993).
Years available	1993-2013
Methodology description	$((Population_{i(2013)}/Population_{i(1993)})^{1/20} - 1) * 100$, where *i* denotes a NUTS3 region
Source	ESPON ESCAPE
Reference	
Publication title	
URL	
Used in cluster analysis	YES

Demography	
Demographic change (simple shrinking typology)	
Short variable name	pop_change_13_33
Long variable name	Yearly rate of population change from 2013 to 2033 as a share of the 2013 population
Abstract	Yearly rate of population change from 2013 to 2033 is the average yearly population change based on the difference between the projected total population numbers in 2033 and the population in 2013, expressed as the ratio (percentage) compared to the total number of population in the starting year of the given period (2013)
Years available	2013-2033
Methodology description	$((Population_{i(2033)}/Population_{i(2013)})^{1/20} - 1) * 100$, where *i* denotes a NUTS3 region
Source	ESPON ESCAPE
Reference	
Publication title	
URL	
Used in cluster analysis	YES

Demography	
Demographic change (simple shrinking typology)	
Short variable name	decad_shrink
Long variable name	Number of decades of shrinking from LAU data (1961-2011)
Abstract	The number of decades of shrinking refers to the number of ten years periods between 1961 and 2011, where a certain region faced population decrease, regardless of the rate of shrinking.
Years available	1961-2011
Methodology description	$SUM_{(i)}d_n$, where *i* denotes a NUTS3 region, *d* denotes a decade of shrinking and *n* denotes the number of decades of shrinking. LAU level data was aggregated at NUTS3 level
Source	DG REGIO, Eurostat
Reference	Historical Population Data from 1961 to 2011
Publication title	Population Data Collection for European Local Administrative Units from 1960 onwards. Final Report
URL	https://ec.europa.eu/eurostat/web/nuts/local-administrative-units
Used in cluster analysis	YES

Economy	
Gross Value Added	
Short variable name	GVAAshare2016
Long variable name	Share of GVA produced by sector A in 2016
Abstract	The share of GVA produced by sector A refers to Gross Value Added produced by the agricultural, forestry and fishing sector (according to NACE rev.2 categorisation), expressed as percentage of the total GVA.
Years available	2016
Methodology description	$GVA_{i,s(2016)}$ / $GVA_{i,tot(2016)}$, where *i* denotes a NUTS3 region, *s* denotes an economic sector, and *tot* denotes the total GVA of region *i*
Source	Eurostat
Reference	Branch and household accounts - Gross value added at basic prices by NUTS3 regions (nama_10r_3gva)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Economy	
Gross Value Added	
Short variable name	GVABFshare2016
Long variable name	Share of GVA produced by sectors B-F in 2016
Abstract	The share of GVA produced by sector B-F refers to Gross Value Added produced by the industrial and construction sectors (according to NACE rev.2 categorisation), expressed as percentage of the total GVA.
Years available	2016
Methodology description	$GVA_{i,s(2016)}$ / $GVA_{i,tot(2016)}$, where *i* denotes a NUTS3 region, *s* denotes an economic sector, and *tot* denotes the total GVA of region *i*
Source	Eurostat
Reference	Branch and household accounts - Gross value added at basic prices by NUTS3 regions (nama_10r_3gva)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Economy	
Gross Value Added	
Short variable name	GVAGNshare2016
Long variable name	Share of GVA produced by sectors G-N in 2016
Abstract	The share of GVA produced by sector G-N refers to Gross Value Added produced by financial service sectors (according to NACE rev.2 categorisation), expressed as percentage of the total GVA.
Years available	2016
Methodology description	$GVA_{i,s(2016)}$ / $GVA_{i,tot(2016)}$, where *i* denotes a NUTS3 region, *s* denotes an economic sector, and *tot* denotes the total GVA of region *i*
Source	Eurostat
Reference	Branch and household accounts - Gross value added at basic prices by NUTS3 regions (nama_10r_3gva)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Economy	
Gross Value Added	
Short variable name	GVAOUshare2016
Long variable name	Share of GVA produced by sectors O-U in 2016
Abstract	The share of GVA produced by sector O-U refers to Gross Value Added produced by public service, arts, households, and other sectors (according to NACE rev.2 categorisation), expressed as percentage of the total GVA.
Years available	2016
Methodology description	$GVA_{i,s(2016)}$ / $GVA_{i,tot(2016)}$, where *i* denotes a NUTS3 region, *s* denotes an economic sector, and *tot* denotes the total GVA of region *i*
Source	Eurostat
Reference	Branch and household accounts - Gross value added at basic prices by NUTS3 regions (nama_10r_3gva)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Economy	
Gross Value Added	
Short variable name	GVAArelch
Long variable name	Relative change in the share of GVA generated by the A sector (2001-2016)
Abstract	The relative change in the share of GVA produced by the sector A refers to the difference in the share of GVA produced by the sector in years 2016 and 2001, expressed as the ratio compared to the share of GVA produced by the sector in 2001.
Years available	2001-2016
Methodology description	$(GVA\ share_{i,s(2016)} - GVA\ share_{i,s(2001)}) / GVA\ share_{i,s(2001)}$, where *i* denotes a NUTS3 region and *s* denotes an economic sector
Source	Eurostat
Reference	Branch and household accounts - Gross value added at basic prices by NUTS3 regions (nama_10r_3gva)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Economy	
Gross Value Added	
Short variable name	GVABFrelch
Long variable name	Relative change in the share of GVA generated by the B-F sectors (2001-2016)
Abstract	The relative change in the share of GVA produced by the sectors B-F refers to the difference in the share of GVA produced by the sectors in years 2016 and 2001, expressed as the ratio compared to the share of GVA produced by the sectors in 2001.
Years available	2001-2016
Methodology description	$(GVA\ share_{i,s(2016)} - GVA\ share_{i,s(2001)}) / GVA\ share_{i,s(2001)}$, where *i* denotes a NUTS3 region and *s* denotes an economic sector
Source	Eurostat
Reference	Branch and household accounts - Gross value added at basic prices by NUTS3 regions (nama_10r_3gva)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Economy	
Gross Value Added	
Short variable name	GVAGNrelch
Long variable name	Relative change in the share of GVA generated by the G-N sectors (2001-2016)
Abstract	The relative change in the share of GVA produced by the sectors G-N refers to the difference in the share of GVA produced by the sectors in years 2016 and 2001, expressed as the ratio compared to the share of GVA produced by the sectors in 2001.
Years available	2001-2016
Methodology description	*(GVA share$_{i,s(2016)}$ – GVA share$_{i,s(2001)}$) / GVA share$_{i,s(2001)}$*, where *i* denotes a NUTS3 region and *s* denotes an economic sector
Source	Eurostat
Reference	Branch and household accounts - Gross value added at basic prices by NUTS3 regions (nama_10r_3gva)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Economy	
Gross Value Added	
Short variable name	GVAOUrelch
Long variable name	Relative change in the share of GVA generated by the O-U sectors (2001-2016)
Abstract	The relative change in the share of GVA produced by the sectors O-U refers to the difference in the share of GVA produced by the sectors in years 2016 and 2001, expressed as the ratio compared to the share of GVA produced by the sectors in 2001.
Years available	2001-2016
Methodology description	*(GVA share$_{i,s(2016)}$ – GVA share$_{i,s(2001)}$) / GVA share$_{i,s(2001)}$*, where *i* denotes a NUTS3 region and *s* denotes an economic sector
Source	Eurostat
Reference	Branch and household accounts - Gross value added at basic prices by NUTS3 regions (nama_10r_3gva)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Economy	
Employment	
Short variable name	EMPAshare2016
Long variable name	Share of employment in sector A in 2016
Abstract	The share of employment in sector A refers to the number of employed persons in the agricultural, forestry and fishing sector (according to NACE rev.2 categorisation), expressed as percentage of the total number of employed persons.
Years available	2016
Methodology description	$EMP_{i,s(2016)}$ / $EMP_{i,tot(2016)}$, where *i* denotes a NUTS3 region, *s* denotes an economic sector, and *tot* denotes the total *EMP* of region *i*
Source	Eurostat
Reference	Branch and household accounts - Employment (thousand persons) by NUTS3 regions (nama_10r_3empers)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Economy	
Employment	
Short variable name	EMPBFshare2016
Long variable name	Share of employment in sectors B-F in 2016
Abstract	The share of employment in sector B-F refers to the number of employed persons in the industrial and construction sectors (according to NACE rev.2 categorisation), expressed as percentage of the total number of employed persons.
Years available	2016
Methodology description	$EMP_{i,s(2016)}$ / $EMP_{i,tot(2016)}$, where *i* denotes a NUTS3 region, *s* denotes an economic sector, and *tot* denotes the total *EMP* of region *i*
Source	Eurostat
Reference	Branch and household accounts - Employment (thousand persons) by NUTS3 regions (nama_10r_3empers)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Economy	
Employment	
Short variable name	EMPGNshare2016
Long variable name	Share of employment in sectors G-N in 2016
Abstract	The share of employment in sector G-N refers to the number of employed persons in financial service sectors (according to NACE rev.2 categorisation), expressed as percentage of the total number of employed persons.
Years available	2016
Methodology description	$EMP_{i,s(2016)}$ / $EMP_{i,tot(2016)}$, where *i* denotes a NUTS3 region, *s* denotes an economic sector, and *tot* denotes the total *EMP* of region *i*
Source	Eurostat
Reference	Branch and household accounts - Employment (thousand persons) by NUTS3 regions (nama_10r_3empers)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Economy	
Employment	
Short variable name	EMPOUshare2016
Long variable name	Share of employment in sectors O-U in 2016
Abstract	The share of employment in sector O-U refers to the number of employed persons in public service, arts, households, and other sectors (according to NACE rev.2 categorisation), expressed as percentage of the total number of employed persons.
Years available	2016
Methodology description	$EMP_{i,s(2016)}$ / $EMP_{i,tot(2016)}$, where *i* denotes a NUTS3 region, *s* denotes an economic sector, and *tot* denotes the total *EMP* of region *i*
Source	Eurostat
Reference	Branch and household accounts - Employment (thousand persons) by NUTS3 regions (nama_10r_3empers)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Economy	
Employment	
Short variable name	EMPArelch
Long variable name	Relative change in the share of employment in the A sector (2001-2016)
Abstract	The relative change in the share of employment in the sector A refers to the difference in the share of employment in the sector in years 2016 and 2001, expressed as the ratio compared to the share of employment in the sector in 2001.
Years available	2001-2016
Methodology description	*(EMP share$_{i,s(2016)}$ – EMP share$_{i,s(2001)}$) / EMP share$_{i,s(2001)}$*, where *i* denotes a NUTS3 region and *s* denotes an economic sector
Source	Eurostat
Reference	Branch and household accounts - Employment (thousand persons) by NUTS3 regions (nama_10r_3empers)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Economy	
Employment	
Short variable name	EMPBFrelch
Long variable name	Relative change in the share of employment in the B-F sectors (2001-2016)
Abstract	The relative change in the share of employment in the sectors B-F refers to the difference in the share of employment in the sectors in years 2016 and 2001, expressed as the ratio compared to the share of employment in the sectors in 2001.
Years available	2001-2016
Methodology description	*(EMP share$_{i,s(2016)}$ – EMP share$_{i,s(2001)}$) / EMP share$_{i,s(2001)}$*, where *i* denotes a NUTS3 region and *s* denotes an economic sector
Source	Eurostat
Reference	Branch and household accounts - Employment (thousand persons) by NUTS3 regions (nama_10r_3empers)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Economy	
Employment	
Short variable name	EMPGNrelch
Long variable name	Relative change in the share of employment in the G-N sectors (2001-2016)
Abstract	The relative change in the share of employment in the sectors G-N refers to the difference in the share of employment in the sectors in years 2016 and 2001, expressed as the ratio compared to the share of employment in the sectors in 2001.
Years available	2001-2016
Methodology description	*(EMP share$_{i,s(2016)}$ – EMP share$_{i,s(2001)}$) / EMP share$_{i,s(2001)}$*, where *i* denotes a NUTS3 region and *s* denotes an economic sector
Source	Eurostat
Reference	Branch and household accounts - Employment (thousand persons) by NUTS3 regions (nama_10r_3empers)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Economy	
Employment	
Short variable name	EMPOUrelch
Long variable name	Relative change in the share of employment in the O-U sectors (2001-2016)
Abstract	The relative change in the share of employment in the sectors O-U refers to the difference in the share of employment in the sectors in years 2016 and 2001, expressed as the ratio compared to the share of employment in the sectors in 2001.
Years available	2001-2016
Methodology description	*(EMP share$_{i,s(2016)}$ – EMP share$_{i,s(2001)}$) / EMP share$_{i,s(2001)}$*, where *i* denotes a NUTS3 region and *s* denotes an economic sector
Source	Eurostat
Reference	Branch and household accounts - Employment (thousand persons) by NUTS3 regions (nama_10r_3empers)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Economy	
GVA per working unit	
Short variable name	prod_relnat2016
Long variable name	GVA per working unit as a percent of the national level in 2016
Abstract	GVA per working unit refers to the ratio of total Gross Value Added and the total number of employed persons, expressed as percentage of the ratio of total Gross Value Added and the total number of employed persons at the national level.
Years available	2016
Methodology description	$(GVA_{i,tot(2016)} / EMP_{i,tot(2016)}) / (GVA_{nat,tot(2016)} / EMP_{nat,tot(2016)}) * 100$, where *i* denotes a NUTS3 region, *tot* denotes the overall GVA and employment of region *i* for prod_relnat2016, and *nat* denotes the total GVA and employment of the country where the region is located
Source	Eurostat
Reference	Branch and household accounts - Gross value added at basic prices by NUTS3 regions (nama_10r_3gva), Employment (thousand persons) by NUTS3 regions (nama_10r_3empers)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Economy	
GVA per working unit	
Short variable name	prodA_relnat2016
Long variable name	GVA per working unit in sector A as a percent of the national level in 2016
Abstract	GVA per working unit in sector A refers to the ratio of Gross Value Added and the number of employed persons in the agricultural, forestry and fishing sector (according to NACE rev.2 categorisation), expressed as percentage of the ratio of Gross Value Added and the number of employed persons in this sector at the national level.
Years available	2016
Methodology description	$(GVA_{i,s(2016)} / EMP_{i,s(2016)}) / (GVA_{nat,s(2016)} / EMP_{nat,s(2016)}) * 100$, where *i* denotes a NUTS3 region, *s* denotes an economic sector (the overall GVA and employment of region *i* for prod_relnat2016), and *nat* denotes the total GVA and employment of the country where the region is located
Source	Eurostat
Reference	Branch and household accounts - Gross value added at basic prices by NUTS3 regions (nama_10r_3gva), Employment (thousand persons) by NUTS3 regions (nama_10r_3empers)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Economy	
GVA per working unit	
Short variable name	prodBF_relnat2016
Long variable name	GVA per working unit in sectors B-F as a percent of the national level in 2016
Abstract	GVA per working unit in sector B-F refers to the ratio of Gross Value Added and the number of employed persons in the industrial and construction sectors (according to NACE rev.2 categorisation), expressed as percentage of the ratio of Gross Value Added and the number of employed persons in this sector at the national level.
Years available	2016
Methodology description	$(GVA_{i,s(2016)} / EMP_{i,s(2016)}) / (GVA_{nat,s(2016)} / EMP_{nat,s(2016)}) * 100$, where *i* denotes a NUTS3 region, *s* denotes an economic sector (the overall GVA and employment of region *i* for prod_relnat2016), and *nat* denotes the total GVA and employment of the country where the region is located
Source	Eurostat
Reference	Branch and household accounts - Gross value added at basic prices by NUTS3 regions (nama_10r_3gva), Employment (thousand persons) by NUTS3 regions (nama_10r_3empers)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Economy	
GVA per working unit	
Short variable name	prodGN_relnat2016
Long variable name	GVA per working unit in sectors G-N as a percent of the national level in 2016
Abstract	GVA per working unit in sector G-N refers to the ratio of Gross Value Added and the number of employed persons in financial service sectors (according to NACE rev.2 categorisation), expressed as percentage of the ratio of Gross Value Added and the number of employed persons in this sector at the national level.
Years available	2016
Methodology description	$(GVA_{i,s(2016)} / EMP_{i,s(2016)}) / (GVA_{nat,s(2016)} / EMP_{nat,s(2016)}) * 100$, where *i* denotes a NUTS3 region, *s* denotes an economic sector (the overall GVA and employment of region *i* for prod_relnat2016), and *nat* denotes the total GVA and employment of the country where the region is located
Source	Eurostat
Reference	Branch and household accounts - Gross value added at basic prices by NUTS3 regions (nama_10r_3gva), Employment (thousand persons) by NUTS3 regions (nama_10r_3empers)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Economy	
GVA per working unit	
Short variable name	prodOU_relnat2016
Long variable name	GVA per working unit in sectors O-U as a percent of the national level in 2016
Abstract	GVA per working unit in sector O-U refers to the ratio of Gross Value Added and the number of employed persons in public service, arts, households and other sectors (according to NACE rev.2 categorisation), expressed as percentage of the ratio of Gross Value Added and the number of employed persons in this sector at the national level.
Years available	2016
Methodology description	$(GVA_{i,s(2016)} / EMP_{i,s(2016)}) / (GVA_{nat,s(2016)} / EMP_{nat,s(2016)}) * 100$, where *i* denotes a NUTS3 region, *s* denotes an economic sector (the overall GVA and employment of region *i* for prod_relnat2016), and *nat* denotes the total GVA and employment of the country where the region is located
Source	Eurostat
Reference	Branch and household accounts - Gross value added at basic prices by NUTS3 regions (nama_10r_3gva), Employment (thousand persons) by NUTS3 regions (nama_10r_3empers)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Economy	
GVA per working unit	
Short variable name	ConvAbsNatProd
Long variable name	Convergence to the national GVA per w. u. (absolute percent points, 2001-2016)
Abstract	Convergence to the national GVA per working unit refers to the difference of total GVA per working unit (as a percentage of the national average) in years 2016 and 2001, expressed as a percentage of the total GVA per working unit in 2001.
Years available	2001-2016
Methodology description	$(Prod_{i,tot(2016)} - Prod_{i,tot(2001)}) / Prod_{i,tot(2001)} * 100$, where *i* denotes a NUTS3 region, *tot* denotes the overall GVA and employment of region *i* for ConvAbsNatProd
Source	Eurostat
Reference	Branch and household accounts - Gross value added at basic prices by NUTS3 regions (nama_10r_3gva), Employment (thousand persons) by NUTS3 regions (nama_10r_3empers)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Economy	
GVA per working unit	
Short variable name	ConvAbsNatProdA
Long variable name	Convergence to the national GVA per w. u. in sector A (absolute percent points, 2001-2016)
Abstract	Convergence to the national GVA per working unit in sector A refers to the difference of total GVA per working unit in sector A (as a percentage of the national average) in years 2016 and 2001, expressed as a percentage of the total GVA per working unit in sector A in 2001.
Years available	2001-2016
Methodology description	$(Prod_{i,s(2016)} - Prod_{i,s(2001)}) / Prod_{i,s(2001)} * 100$, where *i* denotes a NUTS3 region, *s* denotes an economic sector (the overall GVA and employment of region *i* for ConvAbsNatProdA)
Source	Eurostat
Reference	Branch and household accounts - Gross value added at basic prices by NUTS3 regions (nama_10r_3gva), Employment (thousand persons) by NUTS3 regions (nama_10r_3empers)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Economy	
GVA per working unit	
Short variable name	ConvAbsNatProdBF
Long variable name	Convergence to the national GVA per w. u. in sectors B-F (absolute percent points, 2001-2016)
Abstract	Convergence to the national GVA per working unit in sectors B-F refers to the difference of total GVA per working unit in sectors B-F (as a percentage of the national average) in years 2016 and 2001, expressed as a percentage of the total GVA per working unit in sectors B-F in 2001.
Years available	2001-2016
Methodology description	$(Prod_{i,s(2016)} - Prod_{i,s(2001)}) / Prod_{i,s(2001)} * 100$, where *i* denotes a NUTS3 region, *s* denotes an economic sector (the overall GVA and employment of region *i* for ConvAbsNatProdBF)
Source	Eurostat
Reference	Branch and household accounts - Gross value added at basic prices by NUTS3 regions (nama_10r_3gva), Employment (thousand persons) by NUTS3 regions (nama_10r_3empers)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Economy	
GVA per working unit	
Short variable name	ConvAbsNatProdGN
Long variable name	Convergence to the national GVA per w. u. in sectors G-N (absolute percent points, 2001-2016)
Abstract	Convergence to the national GVA per working unit in sectors G-N refers to the difference of total GVA per working unit in sectors G-N (as a percentage of the national average) in years 2016 and 2001, expressed as a percentage of the total GVA per working unit in sectors G-N in 2001.
Years available	2001-2016
Methodology description	$(Prod_{i,s(2016)} - Prod_{i,s(2001)}) / Prod_{i,s(2001)} * 100$, where *i* denotes a NUTS3 region, *s* denotes an economic sector (the overall GVA and employment of region *i* for ConvAbsNatProdGN)
Source	Eurostat
Reference	Branch and household accounts - Gross value added at basic prices by NUTS3 regions (nama_10r_3gva), Employment (thousand persons) by NUTS3 regions (nama_10r_3empers)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Economy	
GVA per working unit	
Short variable name	ConvAbsNatProdOU
Long variable name	Convergence to the national GVA per w. u. in sectors O-U (absolute percent points, 2001-2016)
Abstract	Convergence to the national GVA per working unit in sectors O-U refers to the difference of total GVA per working unit in sectors O-U (as a percentage of the national average) in years 2016 and 2001, expressed as a percentage of the total GVA per working unit in sectors O-U in 2001.
Years available	2001-2016
Methodology description	$(Prod_{i,s(2016)} - Prod_{i,s(2001)}) / Prod_{i,s(2001)} * 100$, where *i* denotes a NUTS3 region, *s* denotes an economic sector (the overall GVA and employment of region *i* for ConvAbsNatProdOU)
Source	Eurostat
Reference	Branch and household accounts - Gross value added at basic prices by NUTS3 regions (nama_10r_3gva), Employment (thousand persons) by NUTS3 regions (nama_10r_3empers)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Economy	
GDP and investments	
Short variable name	GDPpc_PPS2016
Long variable name	GDP per capita (Purchasing Power Standards) in 2016
Abstract	GDP per capita refers to the ratio of total Gross Domestic Product (expressed in Purchasing Power Standards) and total population.
Years available	2016
Methodology description	$GDPPPS_{i(2016)}$ / $Pop_{i(2016)}$, where *i* denotes a NUTS3 region
Source	Eurostat
Reference	Gross domestic product indicators - Gross domestic product (GDP) at current market prices by NUTS3 regions (nama_10r_3gdp)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Economy	
GDP and investments	
Short variable name	GDPrel_PPS2016
Long variable name	GDP per capita (PPS) as a percentage of the EU GDP per capita (PPS) in 2016
Abstract	GDP per capita as a percentage of the EU GDP per capita refers to the GDP per capita of a region, expressed as a percentage of the EU28 GDP per capita.
Years available	2016
Methodology description	$(GDPPPS_{i(2016)} / Pop_{i(2016)}) / (GDPPPS_{EU28(2016)} / Pop_{EU28(2016)}) * 100$, where *i* denotes a NUTS3 region and *EU28* denotes the total (GDP and population) values of the European Union
Source	Eurostat
Reference	Gross domestic product indicators - Gross domestic product (GDP) at current market prices by NUTS3 regions (nama_10r_3gdp)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Economy	
GDP and investments	
Short variable name	GDPrelnat_PPS2016
Long variable name	GDP per capita (PPS) as a percentage of the national GDP per capita (PPS) in 2016
Abstract	GDP per capita as a percentage of the national GDP per capita refers to the GDP per capita of a region, expressed as a percentage of the national GDP per capita.
Years available	2016
Methodology description	$(GDPPPS_{i(2016)} / Pop_{i(2016)}) / (GDPPPS_{NAT(2016)} / Pop_{NAT(2016)}) * 100$, where *i* denotes a NUTS3 region and *NAT* denotes the total (GDP and population) values of the single EU MS
Source	Eurostat
Reference	Gross domestic product indicators - Gross domestic product (GDP) at current market prices by NUTS3 regions (nama_10r_3gdp)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Economy	
GDP and investments	
Short variable name	convergEU_abs
Long variable name	Convergence to the EU GDP per capita (absolute percent points, 2001-2016)
Abstract	Convergence to the EU GDP per capita refers to the difference of GDP per capita of a region in 2016 and 2001 (as a percentage of the EU GDP per capita).
Years available	2001-2016
Methodology description	$GDPrel\_PPS_{i(2016)} - GDPrel\_PPS_{i(2001)}$, where *i* denotes a NUTS3 region
Source	Eurostat
Reference	Gross domestic product indicators - Gross domestic product (GDP) at current market prices by NUTS3 regions (nama_10r_3gdp)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Economy	
GDP and investments	
Short variable name	convergNat_abs
Long variable name	Convergence to the national GDP per capita (absolute percent points, 2001-2016)
Abstract	Convergence to the national GDP per capita refers to the difference of GDP per capita of a region in 2016 and 2001 (as a percentage of the national GDP per capita).
Years available	2001-2016
Methodology description	$GDPrelnat\_PPS_{i(2016)}$ – $GDPrelnat\_PPS_{i(2001)}$, where *i* denotes a NUTS3 region
Source	Eurostat
Reference	Gross domestic product indicators - Gross domestic product (GDP) at current market prices by NUTS3 regions (nama_10r_3gdp)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	YES

Economy	
GDP and investments	
Short variable name	invest_on_gdp
Long variable name	Investments (gross fixed capital formation) as a share of the GDP at NUTS2 level (2016)
Abstract	Investments as a share of the GDP refer to the ratio of gross fixed capital formation and Gross Domestic Product (measured at NUTS2 level).
Years available	2016
Methodology description	$GFCF_{i(2016)}$ / $GDP_{i(2016)}$, where *i* denotes a NUTS2 region
Source	Eurostat
Reference	Gross fixed capital formation by NUTS2 regions (nama_10r_2gfcf), Gross domestic product (GDP) at current market prices by NUTS2 regions (nama_10r_2gdp)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Environment	
Land use and soil erosion	
Short variable name	agri_land_2015
Long variable name	Percentage of land used for agriculture and related activities at NUTS2 level in 2015
Abstract	Percentage of land used for agriculture and related activities refers the area of land used for agriculture and related activities expressed as a percentage of the total area of land (measured at NUTS2 level).
Years available	2015
Methodology description	$L_{u,i(2015)} / L_{tot,i(2015)} * 100$, where *i* denotes a NUTS2 region, *u* denotes a land use type and *tot* denotes total land use in region *i*
Source	Eurostat
Reference	Land cover and land use, landscape (LUCAS) - Land use overview by NUTS2 regions (lan_use_ovw)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Environment	
Land use and soil erosion	
Short variable name	builtup_land_2015
Long variable name	Percentage of land used for services and residential areas at NUTS2 level in 2015
Abstract	Percentage of land used for services and residential areas refers the area of land used for services and residential areas expressed as a percentage of the total area of land (measured at NUTS2 level).
Years available	2015
Methodology description	$L_{u,i(2015)} / L_{tot,i(2015)} * 100$, where *i* denotes a NUTS2 region, *u* denotes a land use type and *tot* denotes total land use in region *i*
Source	Eurostat
Reference	Land cover and land use, landscape (LUCAS) - Land use overview by NUTS2 regions (lan_use_ovw)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Environment	
Land use and soil erosion	
Short variable name	unused_land_2015
Long variable name	Percentage of unused and abandoned land at NUTS2 level in 2015
Abstract	Percentage of unused and abandoned land refers the area unused and abandoned land expressed as a percentage of the total area of land (measured at NUTS2 level).
Years available	2015
Methodology description	$L_{u,i(2015)} / L_{tot,i(2015)} * 100$, where *i* denotes a NUTS2 region, *u* denotes a land use type and *tot* denotes total land use in region *i*
Source	Eurostat
Reference	Land cover and land use, landscape (LUCAS) - Land use overview by NUTS2 regions (lan_use_ovw)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Environment	
Land use and soil erosion	
Short variable name	erosion2016
Long variable name	Rate of soil erosion (t/ha) in 2016
Abstract	Rate of soil erosion refers to the amount of eroded soil (tons), expressed as a ratio of total land area (hectare).
Years available	2016
Methodology description	$E_i / Area_i$, where *i* denotes a NUTS3 region
Source	Eurostat
Reference	Agri-environmental indicators - Estimated soil erosion by water, by erosion level, land cover and NUTS3 regions (source: JRC) (aei_pr_soiler)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Environment	
Land use and soil erosion	
Short variable name	change_agri_land
Long variable name	Change in the percentage of land used for agriculture and related activities at NUTS2 level (absolute points, 2012-2015)
Abstract	Change in the percentage of land used for agriculture and related activities refers to the difference of shares of land used for agriculture and related activities in 2015 and 2012, expressed as absolute percent points (measured at NUTS2 level).
Years available	2012-2015
Methodology description	$L_{u,i(2015)} - L_{u,i(2012)}$, where *i* denotes a NUTS2 region and *u* a land use type
Source	Eurostat
Reference	Land cover and land use, landscape (LUCAS) - Land use overview by NUTS2 regions (lan_use_ovw)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Environment	
Land use and soil erosion	
Short variable name	change_builtup_land
Long variable name	Change in the percentage of land used for services and residential areas at NUTS2 level (absolute points, 2012-2015)
Abstract	Change in the percentage of land used for services and residential areas refers to the difference of shares of land used for services and residential areas in 2015 and 2012, expressed as absolute percent points (measured at NUTS2 level).
Years available	2012-2015
Methodology description	$L_{u,i(2015)} - L_{u,i(2012)}$, where *i* denotes a NUTS2 region and *u* a land use type
Source	Eurostat
Reference	Land cover and land use, landscape (LUCAS) - Land use overview by NUTS2 regions (lan_use_ovw)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Environment	
Land use and soil erosion	
Short variable name	change_unused_land
Long variable name	Change in the percentage of unused and abandoned land at NUTS2 level (absolute points, 2012-2015)
Abstract	Change in the percentage unused and abandoned land refers to the difference of shares of unused and abandoned land in 2015 and 2012, expressed as absolute percent points (measured at NUTS2 level).
Years available	2012-2015
Methodology description	$L_{u,i(2015)} - L_{u,i(2012)}$, where *i* denotes a NUTS2 region and *u* a land use type
Source	Eurostat
Reference	Land cover and land use, landscape (LUCAS) - Land use overview by NUTS2 regions (lan_use_ovw)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Environment	
Land use and soil erosion	
Short variable name	erosion_ch
Long variable name	Change in the rate of soil erosion (absolute percent points, 2000-2016)
Abstract	Change in the rate of soil erosion refers to the difference of ratios of soil erosion in 2016 and 2000, expressed as absolute percent points.
Years available	2000-2016
Methodology description	$E_{i(2016)} - E_{i(2000)}$, where *i* denotes a NUTS3 region
Source	Eurostat
Reference	Agri-environmental indicators - Estimated soil erosion by water, by erosion level, land cover and NUTS3 regions (source: JRC) (aei_pr_soiler)
Publication title	
URL	https://ec.europa.eu/eurostat/data/database
Used in cluster analysis	NO

Policy	
EU Funds	
Short variable name	paymentCF
Long variable name	Cumulated payments from Cohesion Fund per capita at NUTS2 level (2000-2013)
Abstract	Cumulated payments from Cohesion Fund per capita refers to the ratio of total amount of payment from Cohesion Fund from 2000 to 2013 (at NUTS2 level) and the total number of population in the NUTS2 region at the end of 2013.
Years available	2000-2013
Methodology description	$(\sum_{y=2000}^{2013} P_{f,i,y})/Pop_{i(2013)}$, where *f* denotes an EU fund, *i* denotes a NUTS2 region, *y* denotes a year, and $Pop_{i(2013)}$ is the population of region *i* at the end of 2013
Source	DG REGIO
Reference	Historic EU payments by MS & NUTS2 region (Filters by country, period, and fund)
Publication title	
URL	https://cohesiondata.ec.europa.eu/Other/Historic-EU-payments-regionalised-and-modelled/tc55-7ysv
Used in cluster analysis	NO

Policy	
EU Funds	
Short variable name	paymentEAFRD
Long variable name	Cumulated payments from EAFRD per capita at NUTS2 level (2000-2013)
Abstract	Cumulated payments from EAFRD per capita refers to the ratio of total amount of payment from EAFRD from 2000 to 2013 (at NUTS2 level) and the total number of population in the NUTS2 region at the end of 2013.
Years available	2000-2013
Methodology description	$(\sum_{y=2000}^{2013} P_{f,i,y})/Pop_{i(2013)}$, where *f* denotes an EU fund, *i* denotes a NUTS2 region, *y* denotes a year, and $Pop_{i(2013)}$ is the population of region *i* at the end of 2013
Source	DG REGIO
Reference	Historic EU payments by MS & NUTS2 region (Filters by country, period, and fund)
Publication title	
URL	https://cohesiondata.ec.europa.eu/Other/Historic-EU-payments-regionalised-and-modelled/tc55-7ysv
Used in cluster analysis	NO

Policy	
EU Funds	
Short variable name	paymentERDF
Long variable name	Cumulated payments from ERDF per capita at NUTS2 level (2000-2013)
Abstract	Cumulated payments from ERDF per capita refers to the ratio of total amount of payment from ERDF from 2000 to 2013 (at NUTS2 level) and the total number of population in the NUTS2 region at the end of 2013.
Years available	2000-2013
Methodology description	$(\sum_{y=2000}^{2013} P_{f,i,y})/Pop_{i(2013)}$, where *f* denotes an EU fund, *i* denotes a NUTS2 region, *y* denotes a year, and $Pop_{i(2013)}$ is the population of region *i* at the end of 2013
Source	DG REGIO
Reference	Historic EU payments by MS & NUTS2 region (Filters by country, period, and fund)
Publication title	
URL	https://cohesiondata.ec.europa.eu/Other/Historic-EU-payments-regionalised-and-modelled/tc55-7ysv
Used in cluster analysis	NO

Policy	
EU Funds	
Short variable name	paymentESF
Long variable name	Cumulated payments from ESF per capita at NUTS2 level (2000-2013)
Abstract	Cumulated payments from ESF per capita refers to the ratio of total amount of payment from ESF from 2000 to 2013 (at NUTS2 level) and the total number of population in the NUTS2 region at the end of 2013.
Years available	2000-2013
Methodology description	$(\sum_{y=2000}^{2013} P_{f,i,y})/Pop_{i(2013)}$, where *f* denotes an EU fund, *i* denotes a NUTS2 region, *y* denotes a year, and $Pop_{i(2013)}$ is the population of region *i* at the end of 2013
Source	DG REGIO
Reference	Historic EU payments by MS & NUTS2 region (Filters by country, period, and fund)
Publication title	
URL	https://cohesiondata.ec.europa.eu/Other/Historic-EU-payments-regionalised-and-modelled/tc55-7ysv
Used in cluster analysis	NO

2.3 Methodology

To identify meaningful groups through clustering, a number of decisions need to be taken along the procedure. Therefore, there is a certain degree of subjectivity in the output of the procedure. While this subjectivity cannot be totally eliminated, the decisions made at each step need to be motivated, and made explicit to allow replicability of the results. This section provides a detailed overview of the single procedural steps and of the decisions made at each step.

The dataset was created by retaining only the observations corresponding to rural or intermediate EU NUTS3 regions categorised as "shrinking" according to the structural typology of "simple shrinking" (2001-2016). The analysis was implemented using Stata 15 and the *cluster* command.

1. **Missing data**

To avoid the exclusion of the regions for which one or more variables were missing, all variables with missing observations were excluded from the cluster analysis. An exception was made for the French overseas departments of Guadeloupe and Martinique: if a variable was missing only for one of these two regions, the variable was retained resulting in the regions being excluded from the analysis due to the large number of missing data. Relevant economic variables excluded from the clustering procedure due to missing data include, for the tertiary sector, the share of employment and its change, the GVA per working unit and its change; and, for the public sector, the change in the shares of GVA and employment, and the change in the GVA per working unit. The mean values assumed by these variables in the groups were nevertheless tabled *ex post*. Removing these economic variables allowed to retain all French, Polish and Estonian regions, which would otherwise be excluded.

2. **Variable selection**

Pairwise correlation and principal component analysis were used to identify the underlying data structure but they provided no clear indication of underlying patterns, and no preliminary reduction of the dimensions could thus be achieved. Hence, no further variables were excluded based on these procedures. However, territorial dummies for EU macro-regions and for single countries, included in preliminary clustering attempts, were removed because they were dominating the analysis in terms of variance and generating aggregations perfectly in line with these territorial cleavages (Eastern Europe, Central Europe, and Southern and Northern Europe together). Since we applied the clustering algorithm directly to the variables and not to synthetic measures like principal components, we made no preliminary assumptions about the relative importance of the single variables. Overall, 29 variables were retained, pertaining to accessibility; demography (population distribution within the region and population variation along time); and economy (GVA, employment, and GVA per working unit in different sectors, and GDP). Most geographical variables (territorial typologies) were excluded as we wanted geographical differences to emerge endogenously, showing that territorial characteristics matter for "complex shrinking".

3. **Standardisation**

Before applying the clustering algorithm, all the variables were standardised. Instead of calculating the z-score, standardisation was implemented by subtracting the median and dividing by the range of the variable. Indeed, Milligan and Cooper (1998) found that "approaches which standardize by division by the range of the variable [give] consistently superior recovery of the underlying cluster structure" (p. 181).

4. **Clustering algorithm**

We applied both partition (*K-means* and *K-median*) and hierarchical (*average-linkage*, *centroid-linkage*, *complete-linkage*, *median-linkage*, *single-linkage*, *Ward's linkage,* and *weighted-average linkage*) clustering algorithms, which yielded different results in terms of aggregation of the regions. The *complete-linkage* and the *Ward's linkage* hierarchical clustering algorithms generated the best outcomes, while other algorithms resulted in the progressive aggregation of single regions due to the absence of a strong underlying structure in the data. What differentiates the algorithms is the objective function which is maximised (minimised). Ward (1963) used an error-sum-of-squares objective function. More precisely, his method consists in minimising the within-group variance. We decided to retain the cluster partition obtained with this algorithm because the objective function takes into account all observations within each of the groups, and is thus less affected by extreme values, resulting in more equilibrated groups in terms of size.

5. **Number of groups**

To identify the optimal number of groups, both the Calinski-Harabasz pseudo-F and the Duda-Hart index stopping rules were used. However, for most clustering algorithms, these provided different results. In particular, in the case of the *Ward's linkage* method, the Calinski-Harabasz pseudo-F suggested to retain *four* groups, while the Duda-Hart index stopping rule was inconclusive. Therefore, the final number of groups was set as *five* by considering jointly the suggestion of the Calinski-Harabasz pseudo-F and the distribution of the NUTS3 regions in a map, to ensure that meaningful patterns were emerging. The five-group solution was among the best ones according to the Calinski-Harabasz pseudo-F stopping rule. However, in the following we present also the two-group solution (the third best according to the Calinski-Harabasz pseudo-F), to visualise the main cleavage at EU level, and the ten-group solution (one of the best partitions according to the Duda-Hart index), which shows the patterns of further differentiation. The cross-tabulation of the groups allows to visualise how these progressively aggregate/disaggregate, and thus the main cleavages at the EU level in terms of "complex shrinking".

For each of the two-, five-, and ten-cluster solutions, the groups were labelled by observing the *mean value* of key variables within them, and namely: the components of the structural typology of "simple shrinking"; the GDP per capita; its convergence/divergence at national and EU levels; the shares of GVA by economic sector; the GVA per working unit by sector; and the convergence or divergence of the latter at the national level. All the variables, including those not used in the clustering process, were then tabulated for each of the three partitions, and the differences in

the mean value across the groups was tested statistically (using a t-test in the two-group solution, and using an ANOVA test in the five- and ten-group solutions).

2.4 Alternative cluster solutions

This section presents the characteristics of three potential cluster solutions obtained by applying the *Ward's linkage* algorithm to the 29 variables identified above. Table 6 shows how progressive aggregation (disaggregation) allows to pass from two, to five, to ten groups (or vice versa), and the size of each group. Subjective labels are assigned to each group in every cluster partition, and the labels relative to the five-cluster solutions, presented in Chapter 4 of the ESCAPE Final Report, are discussed and refined in section 2.5 of this Annex.

Table 6. Progressive aggregation/disaggregation of the clusters, from ten to two groups.

Two groups		Five groups		Ten groups	
Number	Size	Number	Size	Number	Size
1	284	1	74	1	18
				2	14
				3	42
		2	38	4	38
		3	78	5	48
				6	30
		4	94	7	41
				8	53
2	99	5	99	9	17
				10	82

2.4.1 Two clusters: centre *vs.* periphery

The two-cluster solution (labels in Table 7, geographical distribution in Map 11) differentiates between a smaller cluster of "central" regions, located in Western Germany, the Netherlands and Slovenia (plus one in the UK and one in Portugal), and the EU peripheries. Alternative clustering algorithms applied to the same 29 variables were producing an even clearer split between the EU15 and Eastern European MSs, suggesting that this cleavage is still persisting despite 15 years of common belonging to the EU (13 for Bulgaria and Romania, six for Croatia).

Table 7. Two-cluster solution: labels and sizes of the clusters.

Group	Label	NUTS3 number	NUTS3 (%)
1	Relatively worse-off, more agricultural, internally diverging, losing competitiveness – severe shrinking including active	284	74.2%
2	Relatively better-off, more industrial and servitised, slowly converging and gaining competitiveness – moderate legacy shrinking	99	25.9%

Map 11: Typology of complex shrinking in shrinking rural and intermediate regions (2 classes)

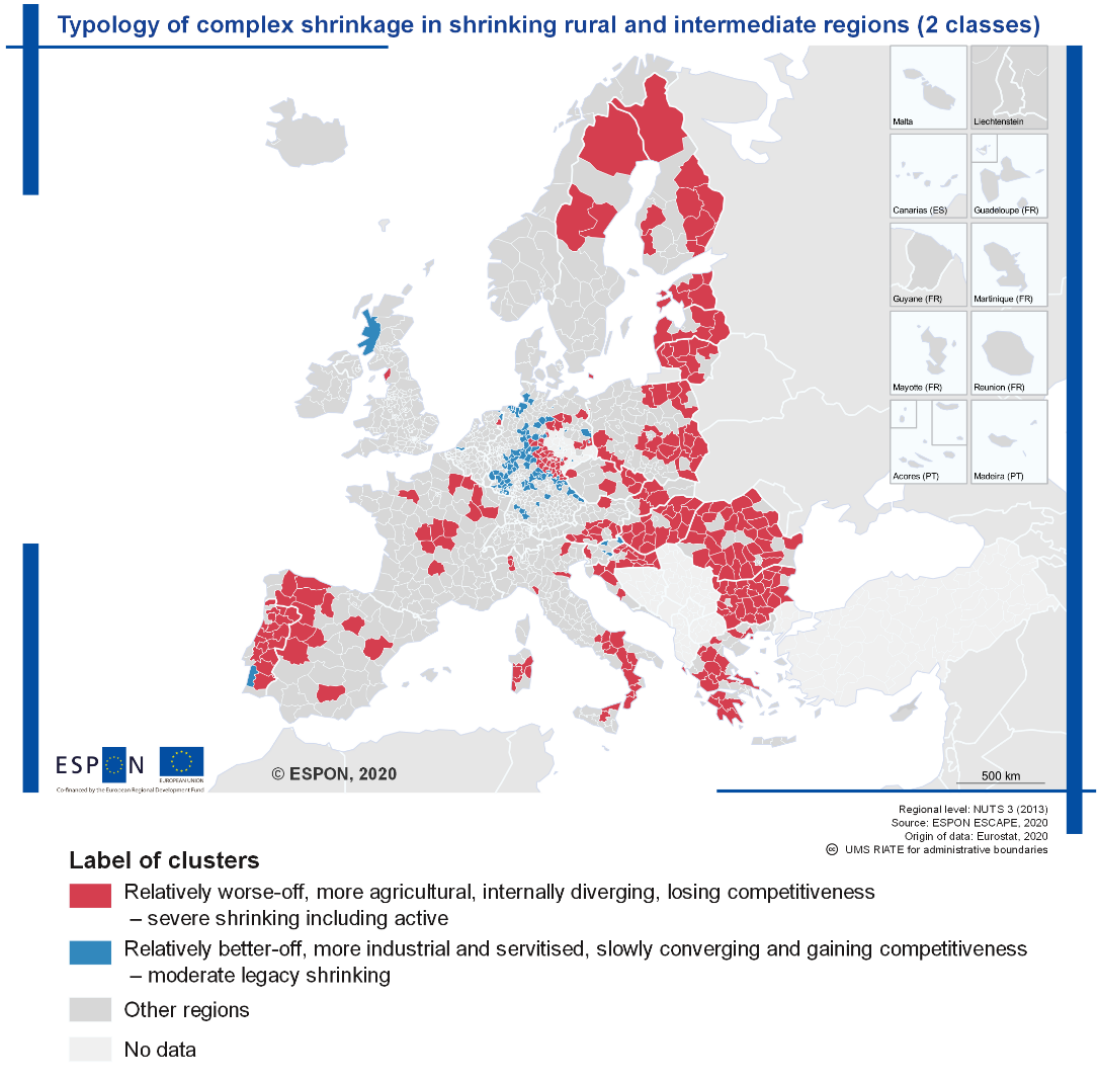


Table 8. Geographical indicators: geographical characteristics (two groups).

Groups	deg_urb	metro_region	capital_metro	post_socialist	ISLAND	COASTAL_share
1	0.60	0.09	0.01	0.59	0.14	19.32
2	0.47	0.23	0.01	0.14	0.00	15.15
Total	0.57	0.13	0.01	0.47	0.10	18.24
t-test (≠)	0.032	0.000	0.764	0.000	0.087	0.333
Groups	mountain_area	mountain_pop	border_region	external_border	MM_Ind_2014	access_ch_00_14
1	0.23	0.37	0.53	0.22	59.04	29.30
2	0.14	0.17	0.28	0.01	107.05	18.93
Total	0.21	0.32	0.47	0.17	71.45	26.62
t-test (≠)	0.055	0.000	0.000	0.000	0.000	0.000
Note: Here and in the following Tables, the variables which do not differ significantly at the 5% level between the groups are displayed in light grey.						

Figure 1. Geographical indicators: geographical characteristics (two groups).

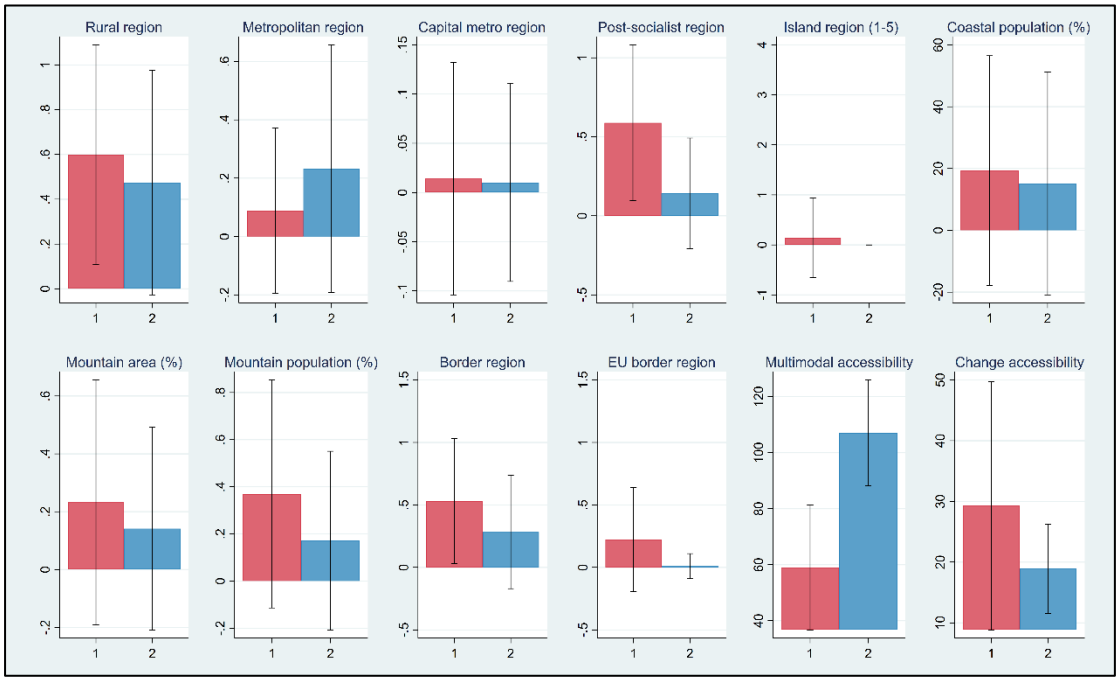


Table 9. Demographic indicators: internal population distribution (two groups).

Groups	Gini _2011	change _Gini	nuts3_ shrink_gap	nuts3_ st_dev	share_ shrinking	pop_den- sity	POP16_64 _share_16
1	0.57	0.01	0.06	0.08	0.73	74.19	0.64
2	0.35	0.00	0.05	0.03	0.86	261.89	0.64
Total	0.51	0.01	0.06	0.07	0.76	122.71	0.64
t-test (≠)	0.000	0.000	0.000	0.000	0.000	0.000	0.134

Figure 2. Demographic indicators: internal population distribution (two groups).

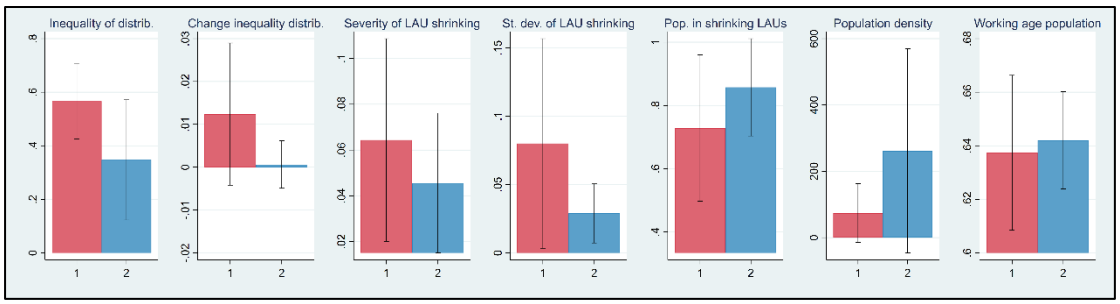


Table 10. Demographic indicators: typologies of "simple shrinking" (two groups).

Groups	rate_shr _01_16	nat_ch _01_16	net_mig _01_16	decad _shrink	pop_chan ge_93_33	pop_chan ge_93_13	pop_chan ge_13_33
1	-9.94	-6.05	-3.89	3.04	-0.65	-0.55	-0.75
2	-4.90	-5.65	0.74	2.14	-0.47	-0.22	-0.71
Total	-8.64	-5.94	-2.69	2.81	-0.60	-0.47	-0.74
t-test (≠)	0.000	0.423	0.000	0.000	0.001	0.000	0.468

Figure 3. Demographic indicators: typologies of "simple shrinking" (two groups).

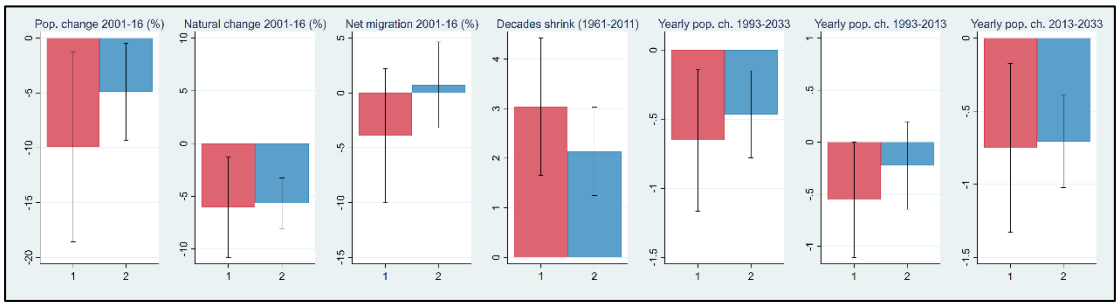


Table 11. Economic indicators: GVA shares by sector, and their change (two groups).

Groups	GVAAshare2016	GVABFshare2016	GVAGNshare2016	GVAOUshare2016
1	0.06	0.32	0.38	0.23
2	0.02	0.34	0.40	0.24
Total	0.05	0.33	0.39	0.23
t-test (≠)	0.000	0.091	0.130	0.034
Groups	GVAArelch	GVABFrelch	GVAGNrelch	GVAOUrelch
1	-0.29	0.04	0.06	0.12
2	-0.16	0.00	0.01	0.03
Total	-0.26	0.03	0.05	0.10
t-test (≠)	0.002	0.119	0.008	0.000

Figure 4. Economic indicators: GVA shares by sector, and their change (two groups).

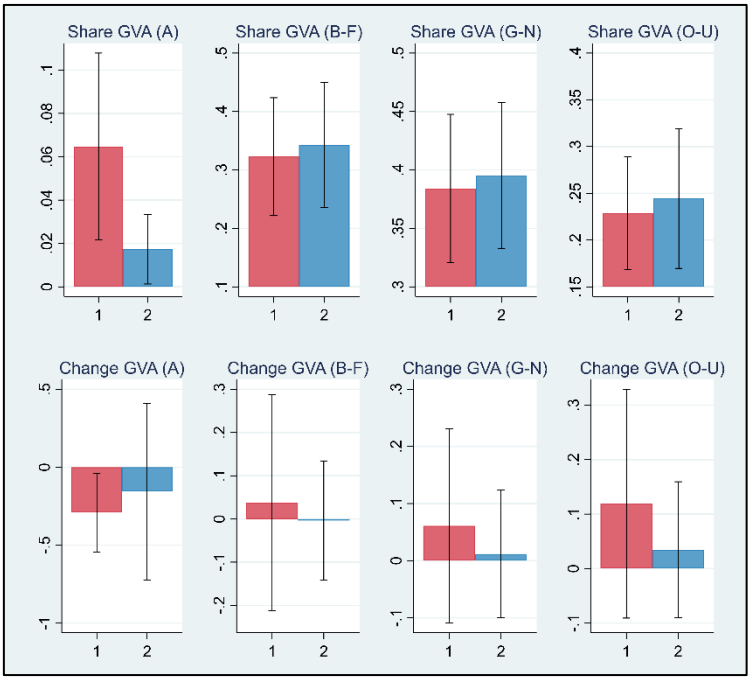


Table 12. Economic indicators: employment shares by sector, and their change (two groups).

Groups	EMPAshare2016	EMPBFshare2016	EMPGNshare2016	EMPOUshare2016
1	0.15	0.28	0.31	0.27
2	0.03	0.29	0.36	0.32
Total	0.12	0.28	0.33	0.28
t-test (≠)	0.000	0.377	0.000	0.000
Groups	EMPArelch	EMPBFrelch	EMPGNrelch	EMPOUrelch
1	-0.24	-0.05	0.23	0.20
2	-0.19	-0.11	0.08	0.07
Total	-0.23	-0.06	0.19	0.17
t-test (≠)	0.123	0.008	0.000	0.000

Figure 5. Economic indicators: employment shares by sector, and their change (two groups).

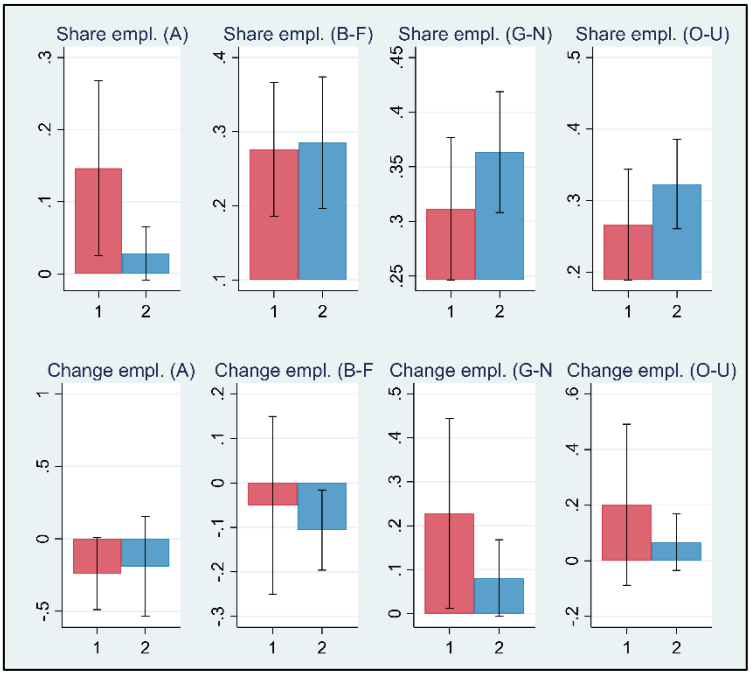


Table 13. Economic indicators: GVA per working unit by sector and convergence to national (two groups).

Groups	prod_relnat2016	prodA_relnat 2016	prodBF_relnat 2016	prodGN_relnat 2016	prodOU_relnat 2016
1	82.56	109.00	86.61	83.57	92.37
2	89.34	123.29	87.14	90.18	92.62
Total	84.31	112.70	86.74	85.29	92.44
t-test (≠)	0.000	0.027	0.861	0.000	0.834
Groups	ConvAbs NatProd	ConvAbs NatProdA	ConvAbs NatProdBF	ConvAbs NatProdGN	ConvAbs NatProdOU
1	-2.12	-1.64	-1.02	-5.10	-0.67
2	1.72	21.26	-3.44	3.10	1.01
Total	-1.13	4.28	-1.64	-2.75	-0.20
t-test (≠)	0.002	0.000	0.266	0.000	0.186

Figure 6. Economic indicators: GVA per working unit by sector and convergence to national (two groups).

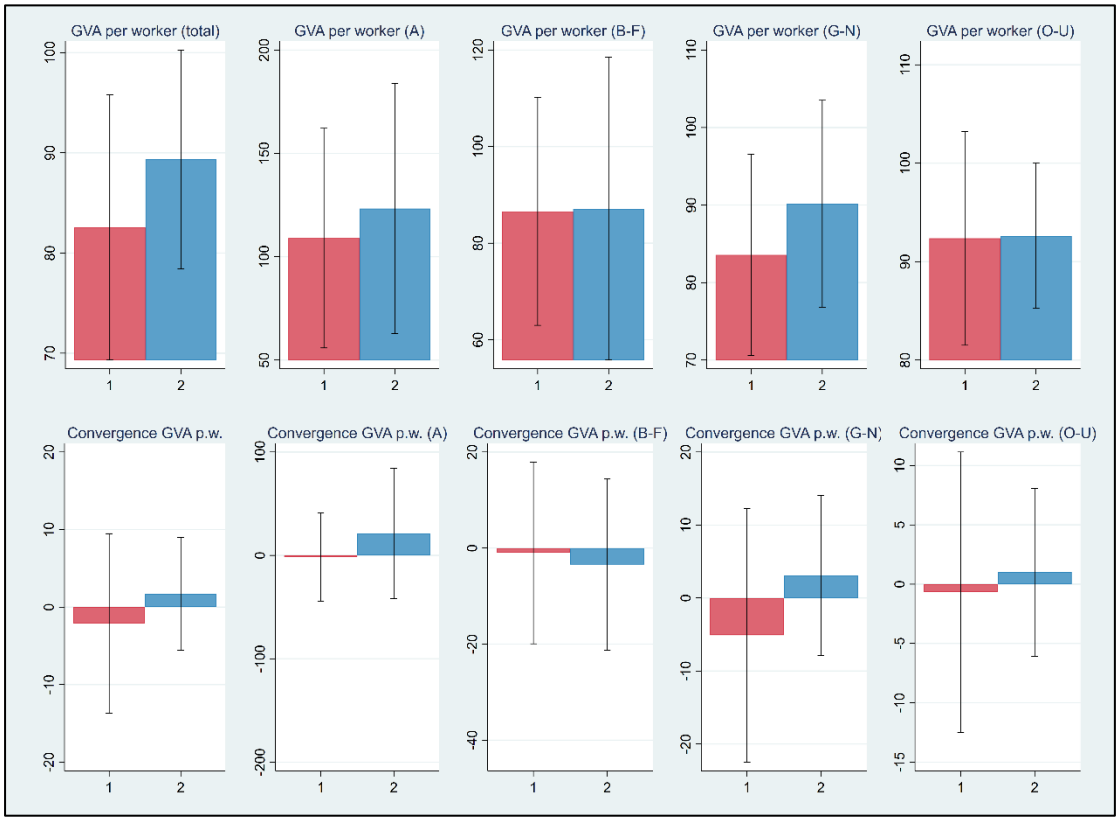


Table 14. Economic indicators: regional economic accounts (GDP and investments) (two groups).

Groups	GDPpc_ PPS2016	GDPrel_ PPS2016	GDPrelnat _PPS2016	converg EU_abs	converg Nat_abs	invest_ on_gdp
1	17,806.82	60.77	73.35	5.14	-2.53	0.19
2	30,292.83	103.39	85.03	4.15	2.10	0.21
Total	21,034.27	71.79	76.37	4.89	-1.33	0.20
t-test (≠)	0.000	0.000	0.000	0.543	0.000	0.000

Figure 7. Economic indicators: regional economic accounts (GDP and investments) (two groups).

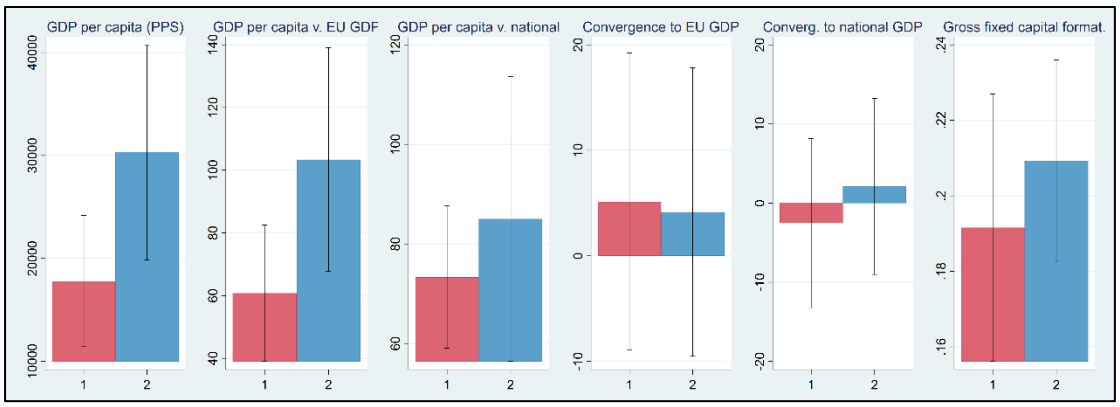


Table 15. Environmental indicators: land use, soil erosion and their change (two groups).

Groups	agri_land_2015	builtup_land_2015	unused_land_2015	erosion2016
1	79.31	4.68	13.06	4.32
2	79.65	9.52	4.86	3.06
Total	79.40	5.93	10.94	4.00
t-test (≠)	0.786	0.000	0.000	0.023
Groups	change_agri_land	change_builtup_land	change_unused_land	erosion_ch
1	-1.15	0.46	0.64	-0.46
2	-1.29	0.45	0.34	-0.61
Total	-1.19	0.45	0.56	-0.50
t-test (≠)	0.630	0.963	0.259	0.040

Figure 8. Environmental indicators: land use, soil erosion and their change (two groups).

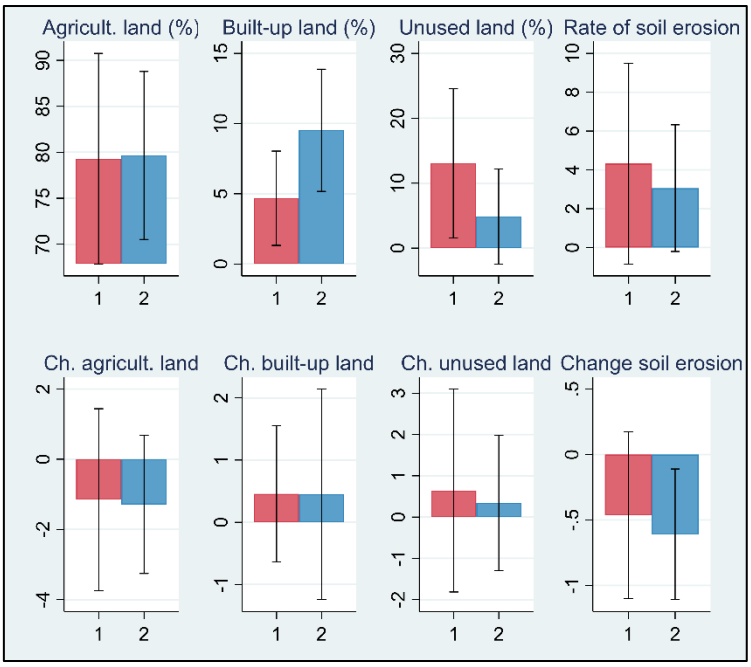
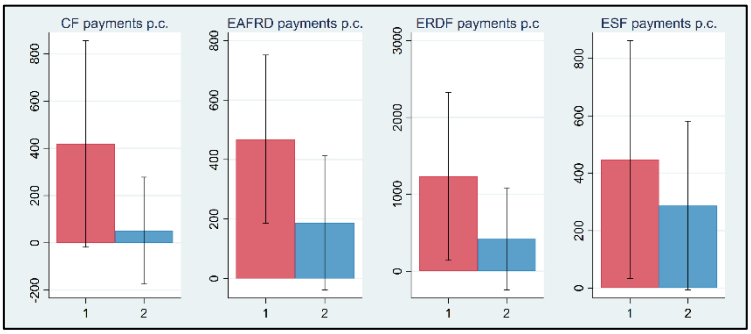


Table 16. Policy indicators: cumulated EU funds payments per capita 2000-2013 (two groups).

Groups	paymentCF	paymentEAFRD	paymentERDF	paymentESF
1	418.47	468.18	1,234.21	447.57
2	51.80	187.43	419.47	287.11
Total	323.69	395.61	1,023.61	406.09
t-test (≠)	0.000	0.000	0.000	0.000

Figure 9. Policy indicators: cumulated EU funds payments per capita 2000-2013 (two groups).



2.4.2 Five clusters: centre *vs.* periphery, East *vs.* West

In the five-group solution (labels in Table 17, geographic distribution in Map 12), the "peripheral" cluster splits into four groups characterised by different severity of shrinking and different economic structures. An East-West divide emerges within the "periphery", with Eastern European shrinking rural regions performing on average worse (in demographic and economic terms) than southern and northern NUTS3 regions. Since this cluster partition is retained in the ESCAPE Final Report, a more detailed overview of the characteristics of the five groups is provided in section 2.5 of this Annex, where more concise and intuitive labels are generated by observing jointly their demographic, economic, and accessibility features.

Table 17. Five-cluster solution: labels and sizes of the clusters.

Group	Label	NUTS3 number	NUTS3 (%)
1	Very low income, agricultural, internally diverging, rapidly losing competitiveness – very severe legacy and active shrinking	74	19.3
2	Mid-income, industrial, doubly converging, gaining competitiveness – severe legacy and active shrinking	38	9.9
3	Low income, industrial, slowly internally diverging, losing competitiveness – moderate legacy and active shrinking	78	20.4
4	Mid-low income, agro-servitised, diverging, losing competitiveness – only moderate legacy shrinking	94	24.5
5	Mid-high income, industrial and servitised, slowly converging, limited competitiveness gain – moderate legacy shrinking, positive migration	99	25.9

Map 12: Typology of complex shrinking in shrinking rural and intermediate regions (5 classes)

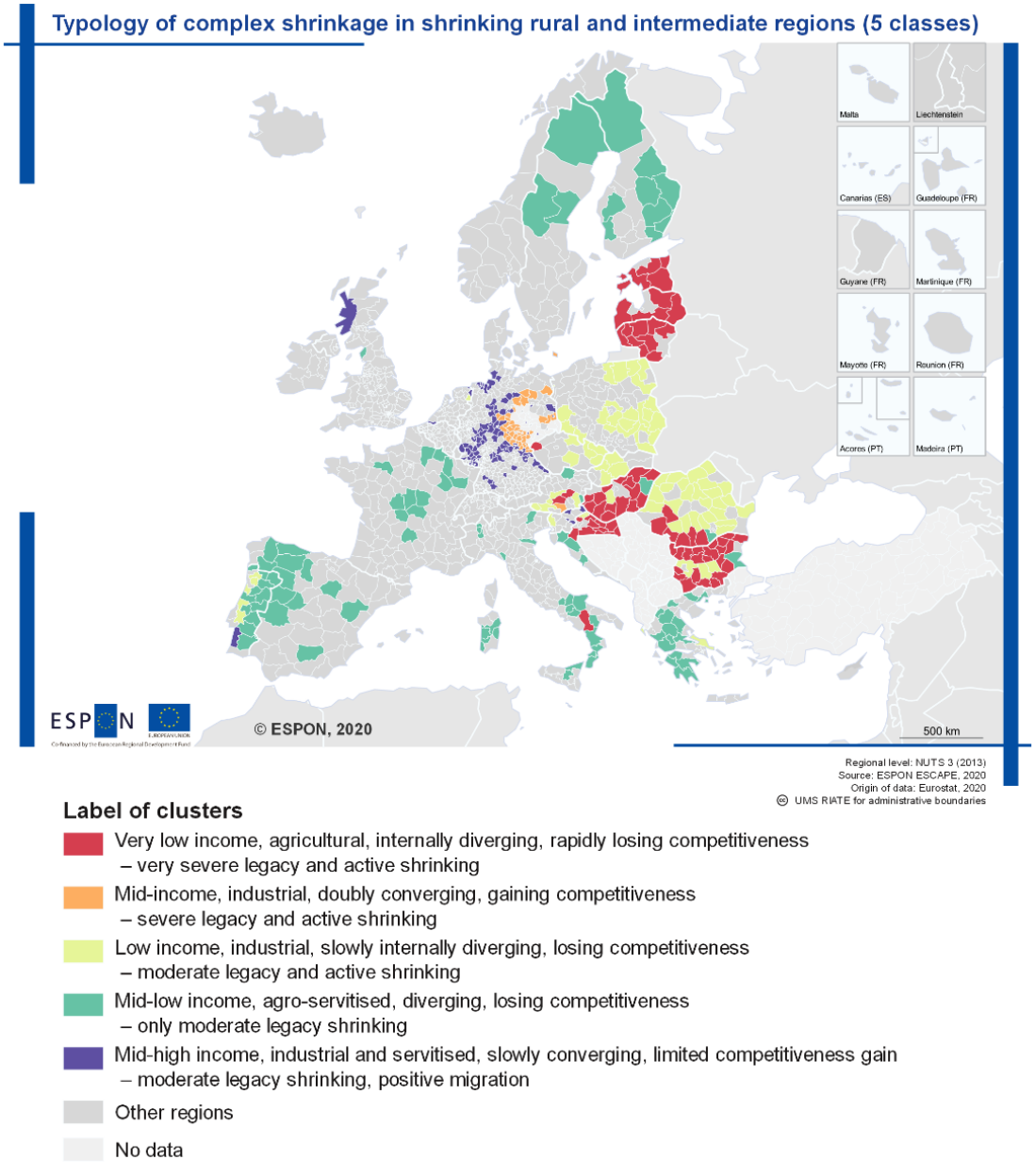


Table 18. Geographical indicators: geographical characteristics (five groups).

Groups	deg_urb	metro_region	capital_metro	post_socialist	ISLAND	COASTAL_share
1	0.45	0.05	0.03	0.96	0.00	7.77
2	0.66	0.16	0.00	0.66	0.03	2.63
3	0.62	0.13	0.03	0.83	0.04	11.59
4	0.68	0.05	0.00	0.06	0.37	41.57
5	0.47	0.23	0.01	0.14	0.00	15.15
Total	0.57	0.13	0.01	0.47	0.10	18.24
ANOVA	0.005	0.001	0.424	0.000	0.001	0.000
Groups	mountain_area	mountain_pop	border_region	external_border	MM_Ind_2014	access_ch_00_14
1	0.18	0.20	0.82	0.38	50.55	38.47
2	0.18	0.29	0.18	0.00	90.49	9.98
3	0.18	0.38	0.55	0.23	56.89	34.38
4	0.34	0.52	0.43	0.18	54.78	25.66
5	0.14	0.17	0.28	0.01	107.05	18.93
Total	0.21	0.32	0.47	0.17	71.45	26.62
ANOVA	0.008	0.000	0.000	0.000	0.000	0.000

Figure 10. Geographical indicators: geographical characteristics (five groups).

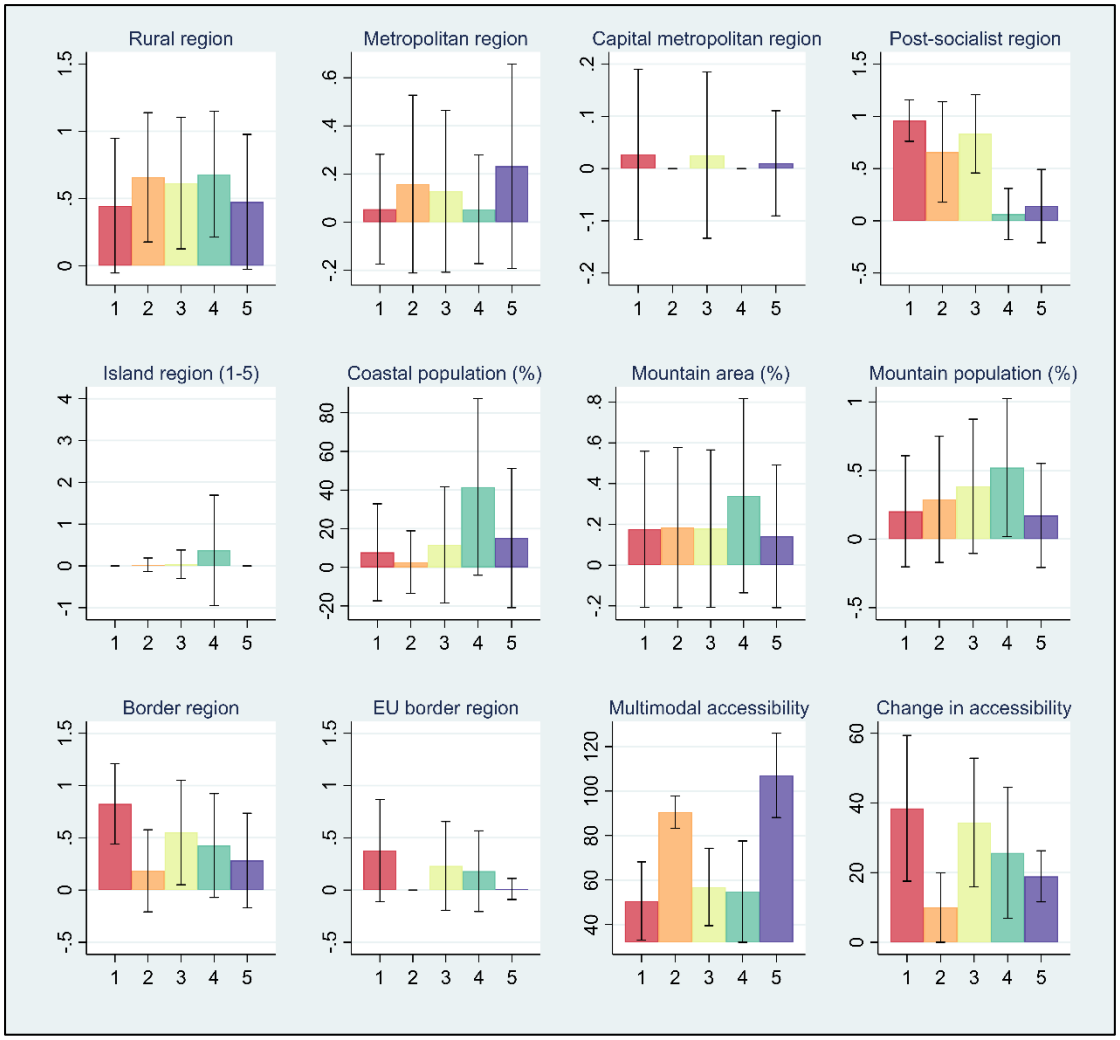


Table 19. Demographic indicators: internal population distribution (five groups).

Groups	Gini_ 2011	change _Gini	nuts3_ shrink_gap	nuts3_ st_dev	share_ shrinking	pop_ density	POP16_64 _share_16
1	0.61	0.01	0.11	0.09	0.92	52.14	0.64
2	0.59	0.00	0.10	0.04	0.98	94.26	0.62
3	0.51	0.01	0.03	0.07	0.57	109.19	0.66
4	0.57	0.02	0.05	0.10	0.61	54.38	0.62
5	0.35	0.00	0.05	0.03	0.86	261.89	0.64
Total	0.51	0.01	0.06	0.07	0.76	122.71	0.64
ANOVA	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Figure 11. Demographic indicators: internal population distribution (five groups).

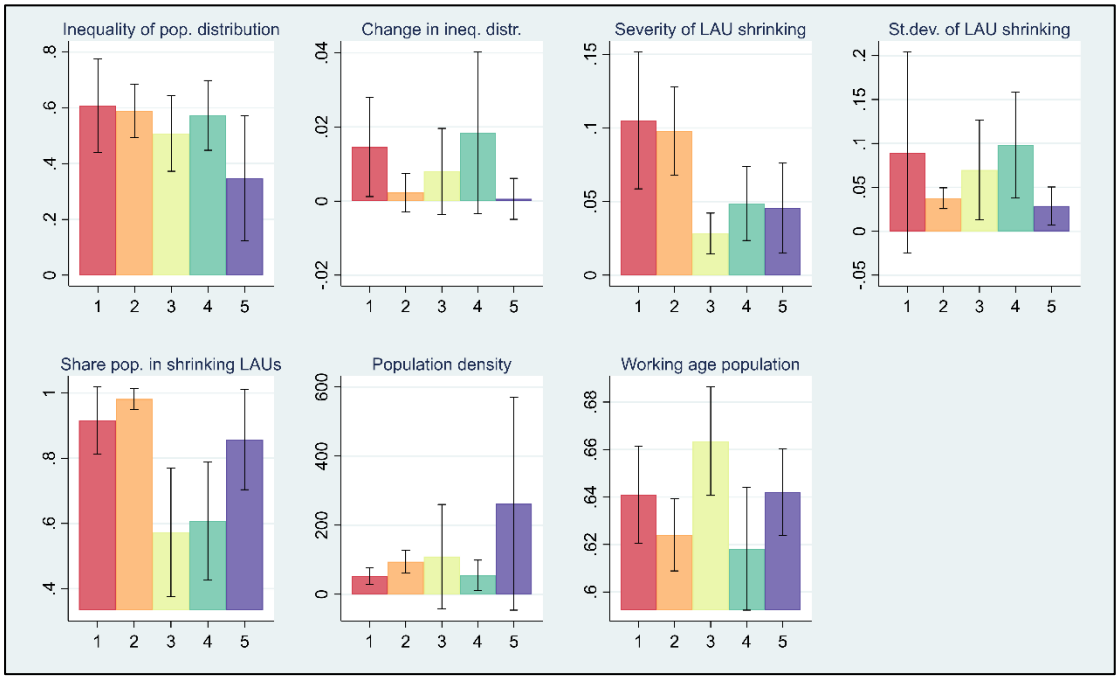


Table 20. Demographic indicators: typologies of "simple shrinking" (five groups).

Groups	rate_shr _01_16	nat_ch _01_16	net_mig _01_16	decad _shrink	pop_chan ge_93_33	pop_chan ge_93_13	pop_chan ge_13_33
1	-18.67	-9.09	-9.58	3.34	-1.12	-1.07	-1.17
2	-15.08	-9.01	-6.06	4.18	-1.06	-0.79	-1.33
3	-4.67	-2.32	-2.35	1.60	-0.35	-0.30	-0.40
4	-5.37	-5.55	0.18	3.53	-0.37	-0.26	-0.48
5	-4.90	-5.65	0.74	2.14	-0.47	-0.22	-0.71
Total	-8.64	-5.94	-2.69	2.81	-0.60	-0.47	-0.74
ANOVA	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Figure 12. Demographic indicators: typologies of "simple shrinking" (five groups).

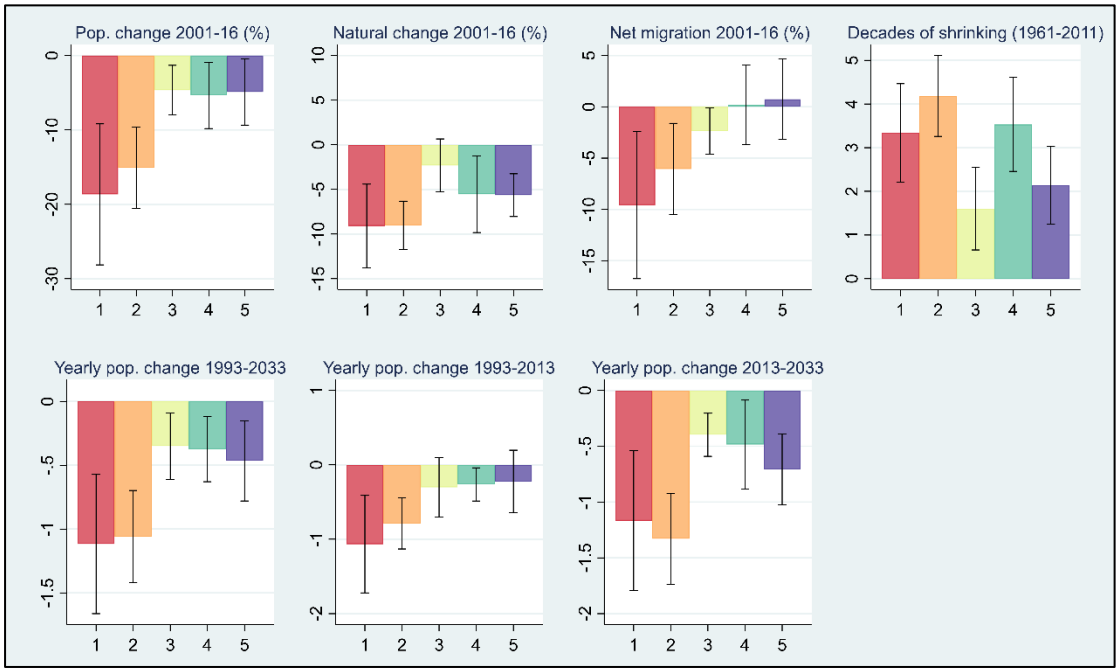


Table 21. Economic indicators: GVA shares by sector, and their change (five groups).

Groups	GVAAshare2016	GVABFshare2016	GVAGNshare2016	GVAOUshare2016
1	0.09	0.34	0.36	0.20
2	0.02	0.38	0.35	0.25
3	0.06	0.38	0.38	0.18
4	0.06	0.24	0.42	0.28
5	0.02	0.34	0.40	0.24
Total	0.05	0.33	0.39	0.23
ANOVA	0.000	0.000	0.000	0.000
Groups	GVAArelch	GVABFrelch	GVAGNrelch	GVAOUrelch
1	-0.29	0.17	0.03	0.09
2	-0.30	0.09	-0.05	-0.01
3	-0.38	0.08	0.13	0.22
4	-0.21	-0.12	0.08	0.13
5	-0.16	0.00	0.01	0.03
Total	-0.26	0.03	0.05	0.10
ANOVA	0.001	0.000	0.000	0.000

Figure 13. Economic indicators: GVA shares by sector, and their change (five groups).

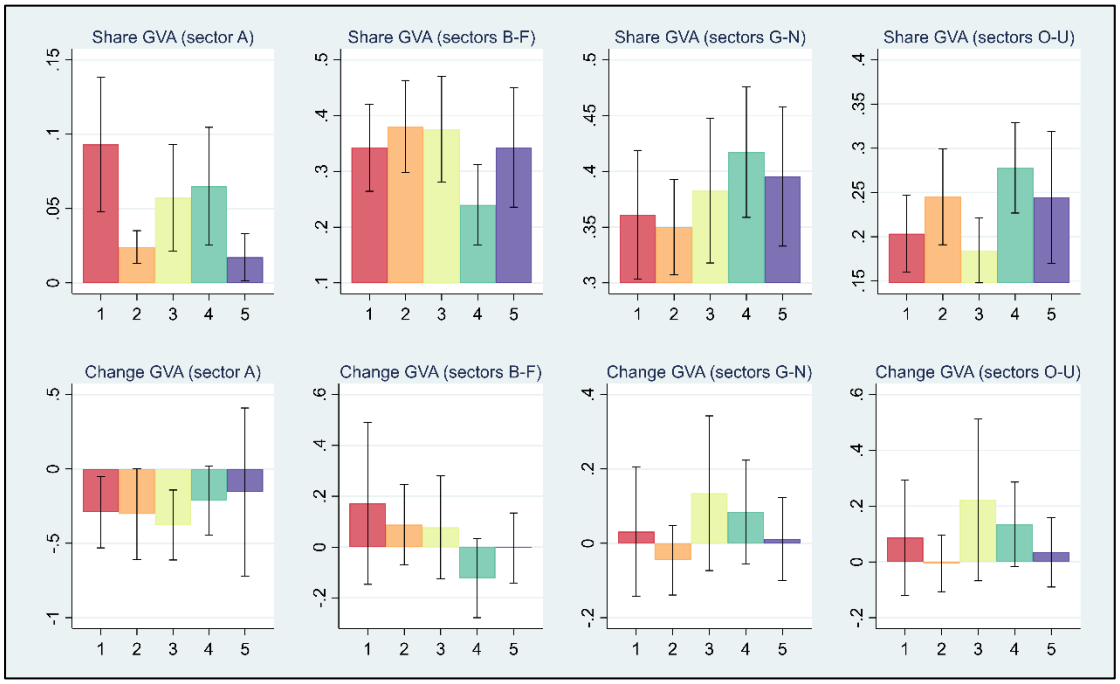


Table 22. Economic indicators: employment shares by sector, and their change (five groups).

Groups	EMPAshare2016	EMPBFshare2016	EMPGNshare2016	EMPOUshare2016
1	0.19	0.29	0.28	0.24
2	0.03	0.33	0.33	0.31
3	0.18	0.33	0.29	0.20
4	0.13	0.20	0.34	0.33
5	0.03	0.29	0.36	0.32
Total	0.12	0.28	0.33	0.28
ANOVA	0.000	0.000	0.000	0.000
Groups	EMPArelch	EMPBFrelch	EMPGNrelch	EMPOUrelch
1	-0.27	0.00	0.27	0.18
2	-0.15	-0.07	0.06	0.04
3	-0.36	0.08	0.34	0.34
4	-0.15	-0.19	0.16	0.17
5	-0.19	-0.11	0.08	0.07
Total	-0.23	-0.06	0.19	0.17
ANOVA	0.000	0.000	0.000	0.000

Figure 14. Economic indicators: employment shares by sector, and their change (five groups).

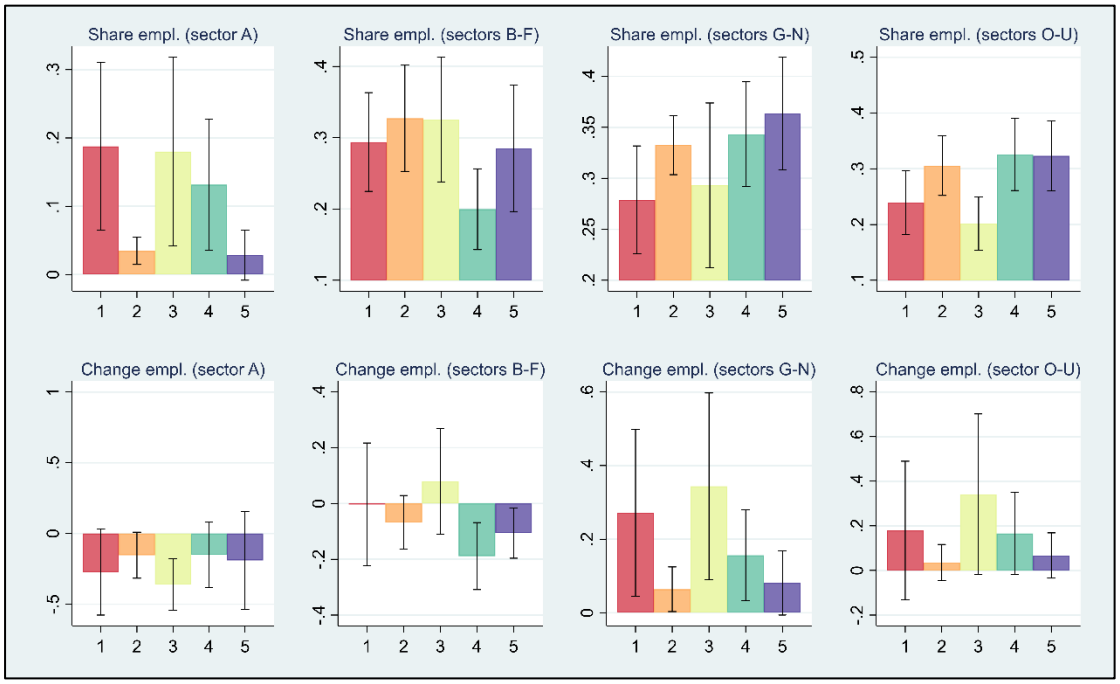


Table 23. Economic indicators: GVA per working unit by sector and convergence to national (five groups).

Groups	prod_relnat2016	prodA_relnat2016	prodBF_relnat2016	prodGN_relnat2016	prodOU_relnat2016
1	78.40	108.65	84.13	80.68	87.34
2	83.31	122.74	76.95	81.15	94.20
3	82.65	114.81	87.02	82.44	91.34
4	85.45	98.90	92.11	87.68	96.44
5	89.34	123.29	87.14	90.18	92.62
Total	84.31	112.70	86.74	85.29	92.44
ANOVA	0.000	0.024	0.034	0.000	0.000
Groups	ConvAbs NatProd	ConvAbs NatProdA	ConvAbs NatProdBF	ConvAbs NatProdGN	ConvAbs NatProdOU
1	-7.63	-5.42	-1.91	-15.85	-4.36
2	8.05	8.50	5.26	5.87	7.31
3	-2.53	3.92	-1.66	-6.22	-1.79
4	-1.54	-7.38	-2.32	-0.13	-0.30
5	1.72	21.26	-3.44	3.10	1.01
Total	-1.13	4.28	-1.64	-2.75	-0.20
ANOVA	0.000	0.000	0.180	0.000	0.000

Figure 15. Economic indicators: GVA per working unit by sector and convergence to national (five groups).

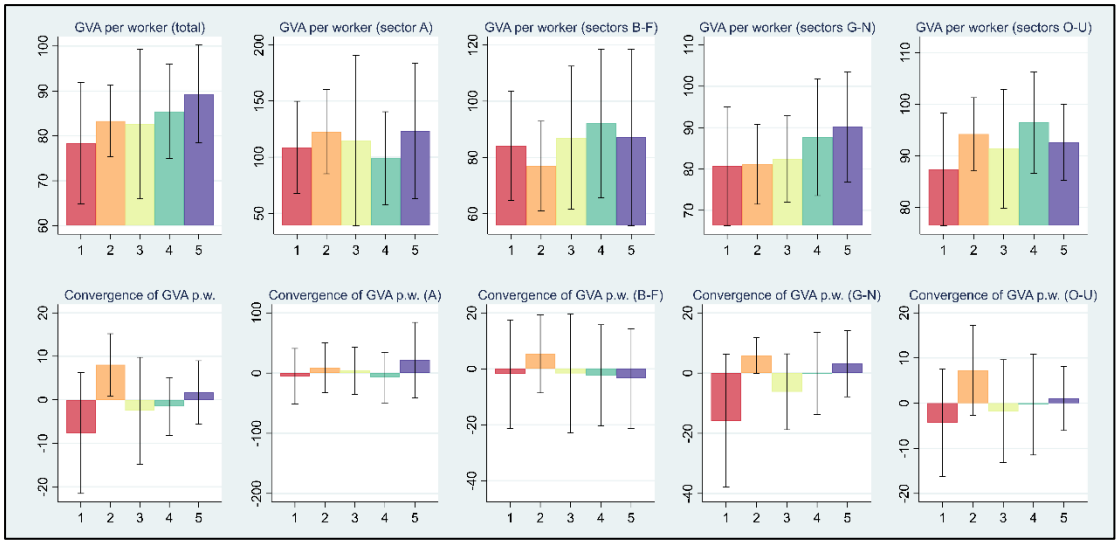


Table 24. Economic indicators: regional economic accounts (GDP and investments) (five groups).

Groups	GDPpc_ PPS2016	GDPrel_ PPS2016	GDPrelnat _PPS2016	converg EU_abs	converg Nat_abs	invest_ on_gdp
1	12,690.54	43.31	66.98	9.72	-9.72	0.20
2	25,346.66	86.51	69.72	11.74	8.21	0.22
3	16,165.39	55.17	77.41	13.27	-4.59	0.18
4	20,148.54	68.77	76.45	-7.88	0.51	0.19
5	30,292.83	103.39	85.03	4.15	2.10	0.21
Total	21,034.27	71.79	76.37	4.89	-1.33	0.20
ANOVA	0.000	0.000	0.000	0.000	0.000	0.000

Figure 16. Economic indicators: regional economic accounts (GDP and investments) (five groups).

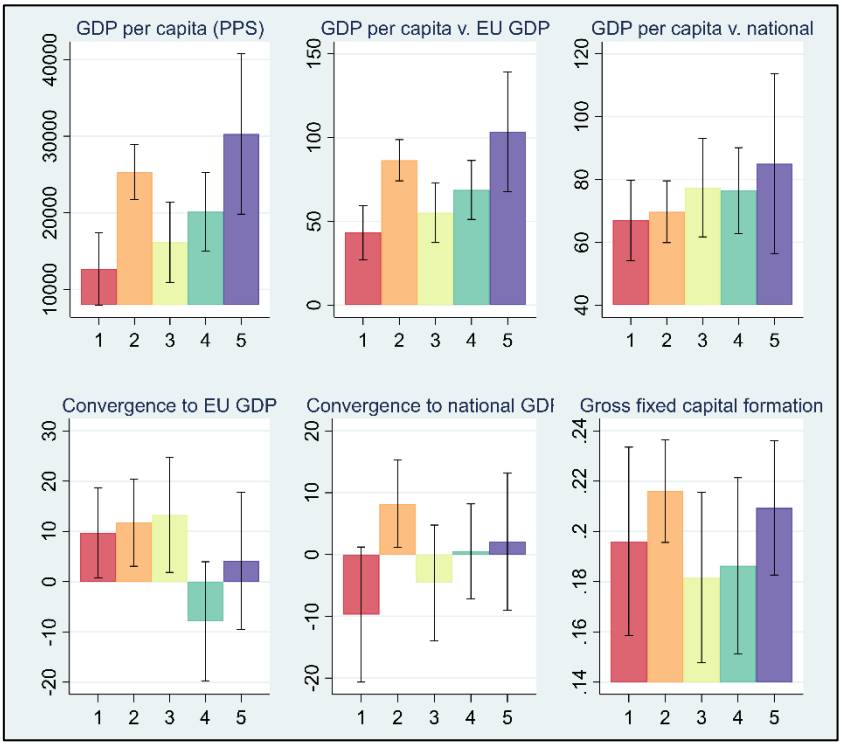


Table 25. Environmental indicators: land use, soil erosion and their change (five groups).

Groups	agri_land_2015	builtup_land_2015	unused_land_2015	erosion2016
1	84.45	3.46	9.85	3.05
2	81.93	9.12	4.04	2.27
3	83.93	3.82	9.77	4.74
4	70.36	4.56	21.96	5.81
5	79.65	9.52	4.86	3.06
Total	79.40	5.93	10.94	4.00
ANOVA	0.000	0.000	0.000	0.000
Groups	change_agri_land	change_builtup_land	change_unused_land	erosion_ch
1	-1.13	0.09	0.91	-0.27
2	-1.81	1.82	-0.03	-1.01
3	-0.22	0.14	0.04	-0.31
4	-1.67	0.41	1.24	-0.52
5	-1.29	0.45	0.34	-0.61
Total	-1.19	0.45	0.56	-0.50
ANOVA	0.001	0.000	0.002	0.000

Figure 17. Environmental indicators: land use, soil erosion, and their change (five groups).

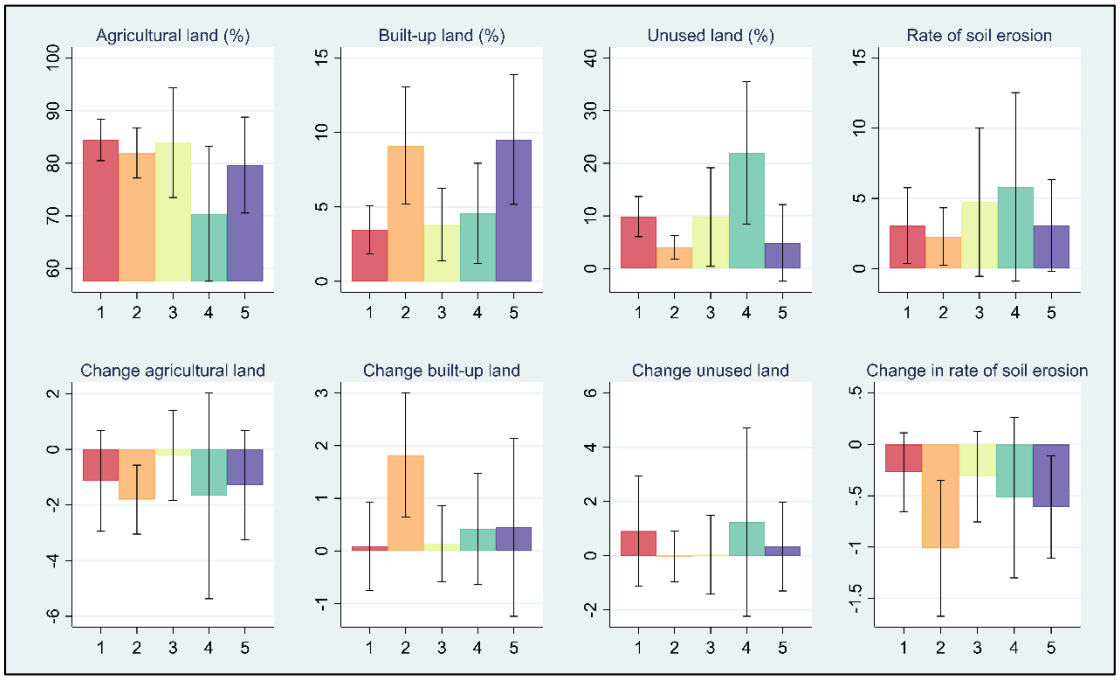
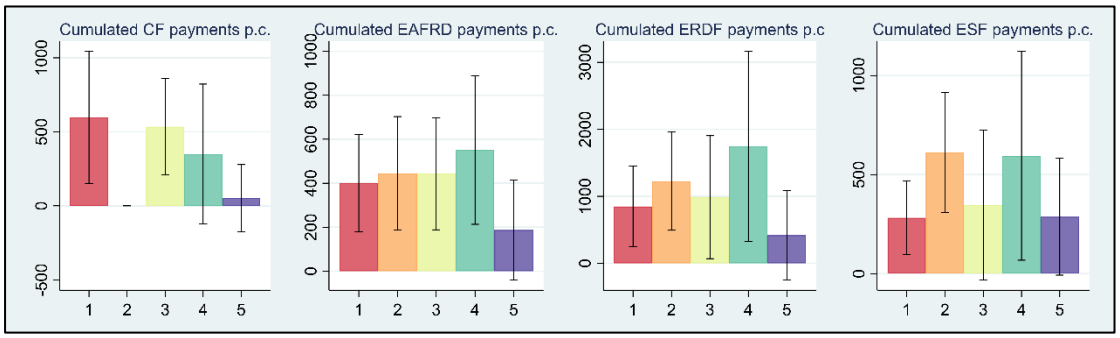


Table 26. Policy indicators: cumulated EU funds payments per capita 2000-2013 (five groups).

Groups	paymentCF	paymentEAFRD	paymentERDF	paymentESF
1	597.99	401.10	847.91	281.95
2	0.00	445.58	1,224.86	612.29
3	534.59	442.87	987.44	346.41
4	349.96	551.13	1,746.87	595.29
5	51.80	187.43	419.47	287.11
Total	323.69	395.61	1,023.61	406.09
ANOVA	0.000	0.000	0.000	0.000

Figure 18. Policy indicators: cumulated EU funds payments per capita 2000-2013 (five groups).



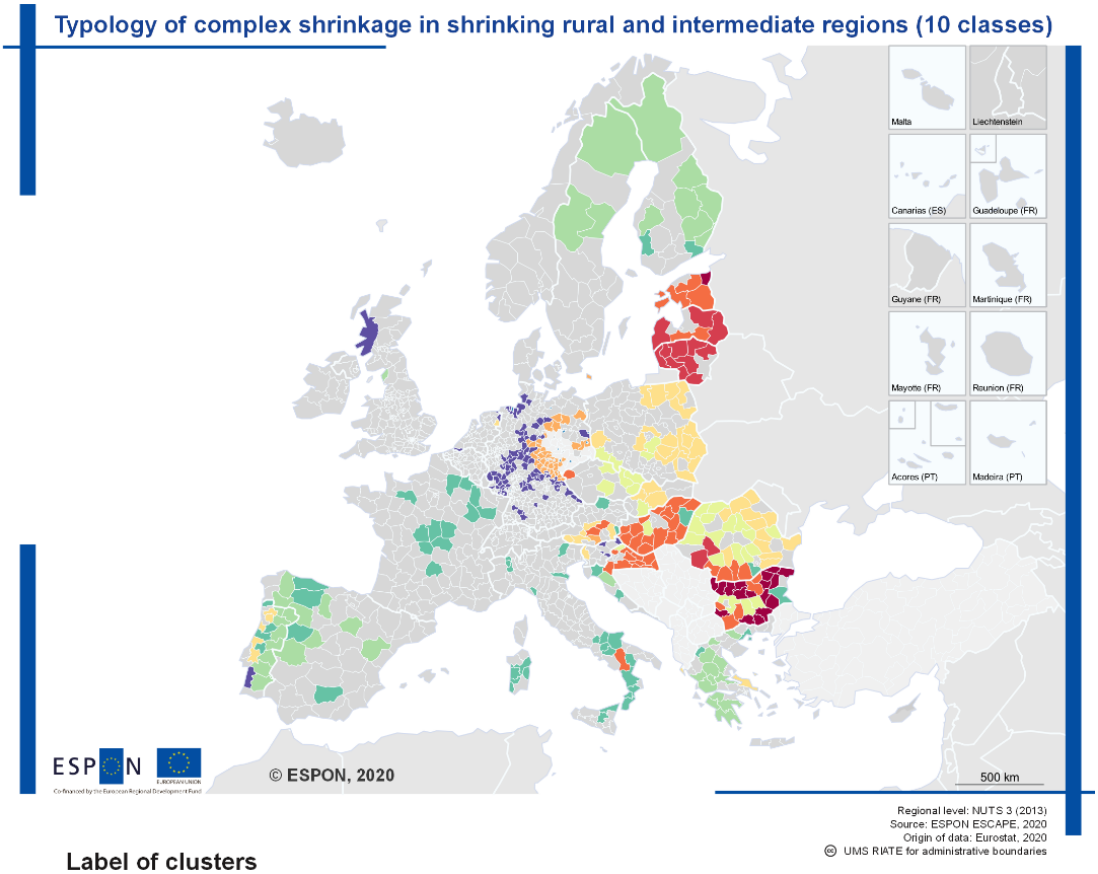
2.4.1 Ten clusters: diverse centres, diverse peripheries

The ten-cluster partition (labels in Table 27, geographic distribution in Map 13) adds some nuance to the previous one by showing further differentiation within the "periphery" and, to a more limited extent, the "core". Bulgaria and the Baltics (except their capitals) perform worse than the rest of Central-Eastern Europe; in the centre-south, Greece and Portugal seem in a worse situation than Italy and France; and in the "core" of the EU the East-West (and intermediate-rural) divide is replicated, with Eastern German city-districts splitting from the rest of the group. Compared to the previous cluster solutions, demographic change and economic performance seem to decouple even more, so that they do not follow the same, linear trend as we proceed from the first to the last of the groups.

Table 27. Ten-cluster solution: labels and sizes of the clusters.

Group	Label	NUTS3 number	NUTS3 (%)
1	Extremely low income, agricultural, rapidly internally diverging, rapidly losing competitiveness - very severe legacy and active shrinking	18	4.7
2	Very low income, agro-servitised, rapidly converging but internally diverging, losing competitiveness – severe legacy and extremely severe active shrinking	14	3.7
3	Very low income, agro-industrial, internally diverging, losing competitiveness – severe legacy and active shrinking	42	11.0
4	Mid income, industrial, rapidly converging, gaining competitiveness – severe legacy and active shrinking	38	9.9
5	Low income, servitised, internally diverging, stagnating competitiveness – modest legacy and active shrinking	48	12.5
6	Low income, mixed economy, converging but internally diverging, losing competitiveness – modest legacy and active shrinking	30	7.8
7	Mid-low income, agro-servitised, internally converging, stagnating competitiveness – moderate legacy shrinking	41	10.7
8	Mid-low income, servitised, doubly diverging, losing competitiveness – modest legacy shrinking	53	13.8
9	High income, highly servitised, slowly converging, limited competitiveness gains – moderate legacy shrinking	17	4.4%
10	Mid income, industrial, not converging, stagnating competitiveness – modest legacy shrinking, positive migration	82	21.4%

Map 13: Typology of complex shrinking in shrinking rural and intermediate regions (10 classes)



Label of clusters

- Extremely low income, agricultural, rapidly internally diverging, rapidly losing competitiveness - very severe legacy and active shrinking
- Very low income, agro-servitised, rapidly converging but internally diverging, losing competitiveness – severe legacy and extremely severe active shrinking
- Very low income, agro-industrial, internally diverging, losing competitiveness – severe legacy and active shrinking
- Mid income, industrial, rapidly converging, gaining competitiveness – severe legacy and active shrinking
- Low income, servitised, internally diverging, stagnating competitiveness – modest legacy and active shrinking
- Low income, mixed economy, converging but internally diverging, losing competitiveness – modest legacy and active shrinking
- Mid-low income, agro-servitised, internally converging, stagnating competitiveness – moderate legacy shrinking
- Mid-low income, servitised, doubly diverging, losing competitiveness – modest legacy shrinking
- High income, highly servitised, slowly converging, limited competitiveness gains – moderate legacy shrinking
- Mid income, industrial, not converging, stagnating competitiveness – modest legacy shrinking, positive migration
- Other regions
- No data

Table 28. Geographical indicators: geographical characteristics (ten groups).

Groups	deg_urb	metro_re-gion	capi-tal_metro	post_social-ist	ISLAND	COASTAL _share
1	0.33	0.00	0.00	1.00	0.00	10.28
2	0.29	0.07	0.00	1.00	0.00	13.14
3	0.55	0.07	0.05	0.93	0.00	4.90
4	0.66	0.16	0.00	0.66	0.03	2.63
5	0.69	0.10	0.00	0.73	0.06	18.83
6	0.50	0.17	0.07	1.00	0.00	0.00
7	0.80	0.00	0.00	0.02	0.00	34.54
8	0.58	0.09	0.00	0.09	0.66	47.02
9	0.18	0.29	0.00	0.47	0.00	23.53
10	0.54	0.22	0.01	0.07	0.00	13.41
Total	0.57	0.13	0.01	0.47	0.10	18.24
ANOVA	0.000	0.007	0.136	0.000	0.000	0.000
Groups	moun-tain_area	moun-tain_pop	border_re-gion	exter-nal_border	MM_Ind_2014	access_ ch_00_14
1	0.28	0.33	0.72	0.33	40.97	37.10
2	0.07	0.14	0.86	0.64	39.65	59.12
3	0.17	0.17	0.86	0.31	58.29	32.17
4	0.18	0.29	0.18	0.00	90.49	9.98
5	0.19	0.38	0.54	0.29	55.10	28.35
6	0.17	0.40	0.57	0.13	59.77	44.03
7	0.29	0.54	0.54	0.27	38.59	22.10
8	0.38	0.51	0.34	0.11	67.31	28.42
9	0.06	0.06	0.29	0.00	103.96	17.98
10	0.16	0.20	0.28	0.01	107.69	19.13
Total	0.21	0.32	0.47	0.17	71.45	26.62
ANOVA	0.039	0.000	0.000	0.000	0.000	0.000

Figure 19. Geographical indicators: geographical characteristics (ten groups).

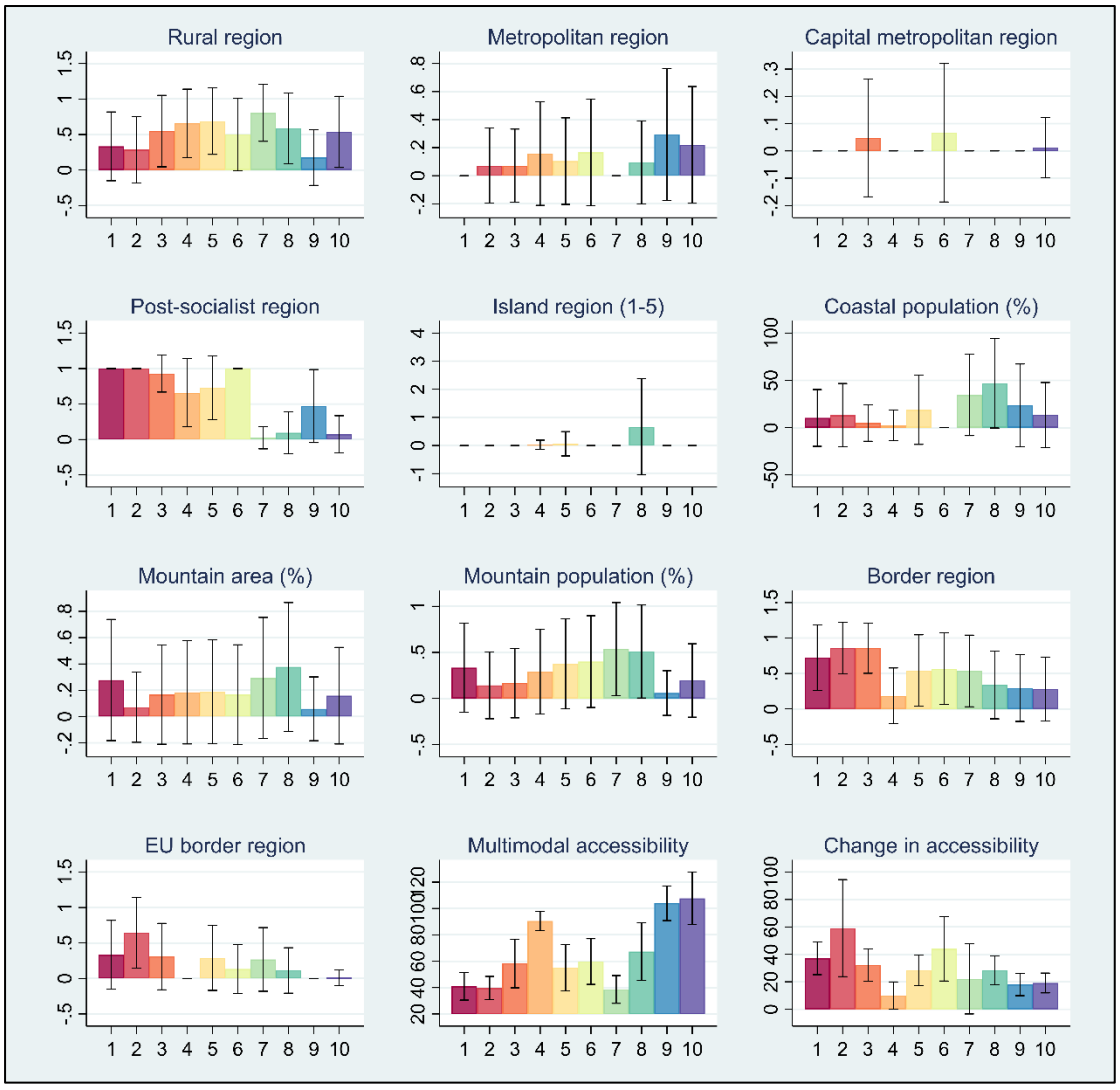


Table 29. Demographic indicators: internal population distribution (ten groups).

Groups	Gini _2011	Change _Gini	nuts3_ shrink_gap	nuts3_ st_dev	share_ shrinking	pop_den- sity	POP16_64 _share_16
1	0.76	0.03	0.15	0.10	0.95	42.89	0.62
2	0.40	0.01	0.14	0.04	0.97	33.56	0.64
3	0.61	0.01	0.07	0.10	0.88	62.31	0.65
4	0.59	0.00	0.10	0.04	0.98	94.26	0.62
5	0.46	0.01	0.02	0.06	0.50	114.36	0.66
6	0.59	0.00	0.03	0.08	0.69	100.93	0.66
7	0.54	0.03	0.06	0.11	0.58	27.93	0.61
8	0.60	0.01	0.04	0.09	0.63	74.85	0.63
9	0.00	0.00	0.08	0.00	1.00	806.58	0.63
10	0.42	0.00	0.04	0.03	0.83	148.97	0.64
Total	0.51	0.01	0.06	0.07	0.76	122.71	0.64
ANOVA	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Figure 20. Demographic indicators: internal population distribution (ten groups).

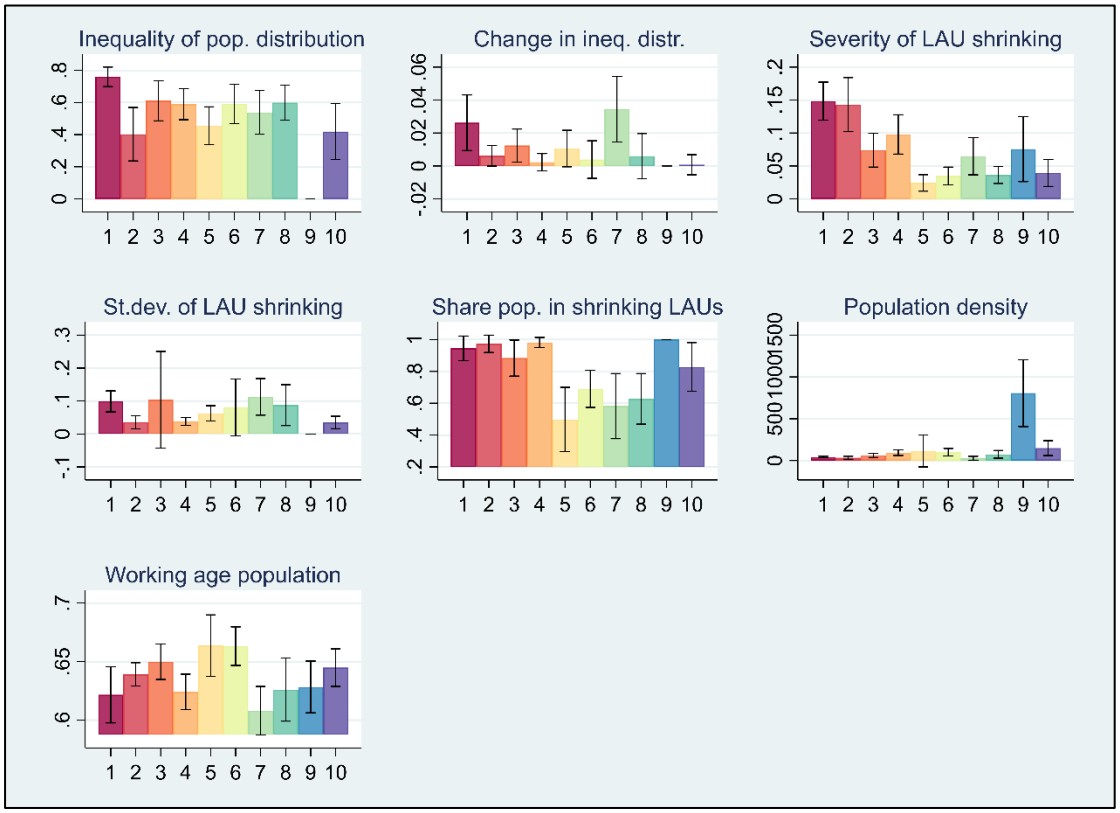


Table 30. Demographic indicators: typologies of "simple shrinking" (ten groups).

Groups	rate_shr _01_16	nat_ch _01_16	net_mig _01_16	decad _shrink	pop_chan ge_93_33	pop_chan ge_93_13	pop_chan ge_13_33
1	-24.33	-12.70	-11.63	3.72	-1.47	-1.49	-1.46
2	-28.84	-9.22	-19.62	2.57	-1.66	-1.35	-1.97
3	-12.85	-7.50	-5.35	3.43	-0.78	-0.79	-0.77
4	-15.08	-9.01	-6.06	4.18	-1.06	-0.79	-1.33
5	-4.08	-1.43	-2.65	1.23	-0.30	-0.19	-0.40
6	-5.60	-3.73	-1.87	2.20	-0.44	-0.48	-0.39
7	-7.11	-7.16	0.04	3.80	-0.51	-0.31	-0.71
8	-4.02	-4.30	0.28	3.32	-0.27	-0.22	-0.31
9	-7.97	-7.49	-0.49	3.18	-0.81	-0.88	-0.75
10	-4.27	-5.27	1.00	1.93	-0.39	-0.09	-0.70
Total	-8.64	-5.94	-2.69	2.81	-0.60	-0.47	-0.74
ANOVA	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Figure 21. Demographic indicators: typologies of "simple shrinking" (ten groups).

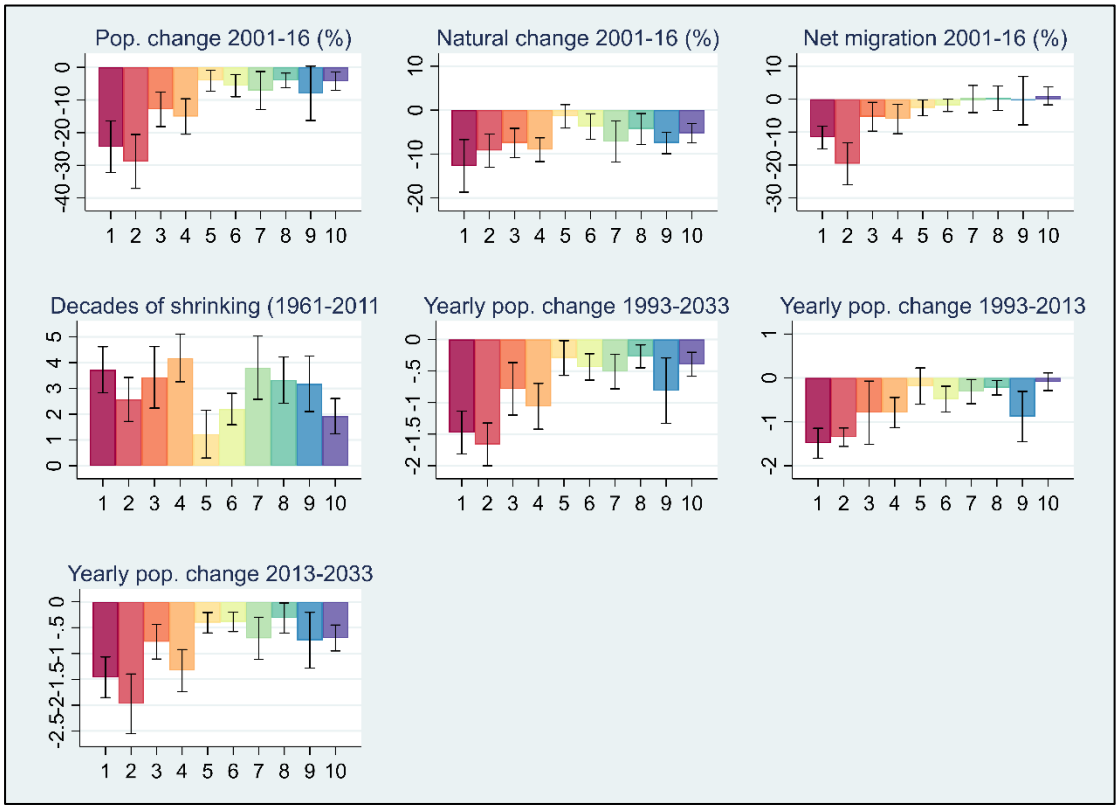


Table 31. Economic indicators: GVA shares by sector, and their change (ten groups).

Groups	GVAAshare2016	GVABFshare2016	GVAGNshare2016	GVAOUshare2016
1	0.13	0.33	0.35	0.19
2	0.07	0.32	0.43	0.18
3	0.09	0.35	0.34	0.22
4	0.02	0.38	0.35	0.25
5	0.06	0.33	0.41	0.20
6	0.05	0.45	0.34	0.16
7	0.09	0.25	0.39	0.27
8	0.05	0.23	0.44	0.28
9	0.00	0.23	0.43	0.34
10	0.02	0.37	0.39	0.23
Total	0.05	0.33	0.39	0.23
ANOVA	0.000	0.000	0.000	0.000
Groups	GVAArelch	GVABFrelch	GVAGNrelch	GVAOUrelch
1	-0.42	0.48	-0.02	0.11
2	-0.31	-0.01	0.18	-0.03
3	-0.23	0.10	0.01	0.12
4	-0.30	0.09	-0.05	-0.01
5	-0.30	0.03	0.23	0.23
6	-0.51	0.16	0.03	0.21
7	-0.19	-0.11	0.11	0.11
8	-0.23	-0.13	0.06	0.15
9	0.26	-0.06	0.02	0.04
10	-0.24	0.01	0.01	0.03
Total	-0.26	0.03	0.05	0.10
ANOVA	0.000	0.000	0.000	0.000

Figure 22. Economic indicators: GVA shares by sector, and their change (ten groups).

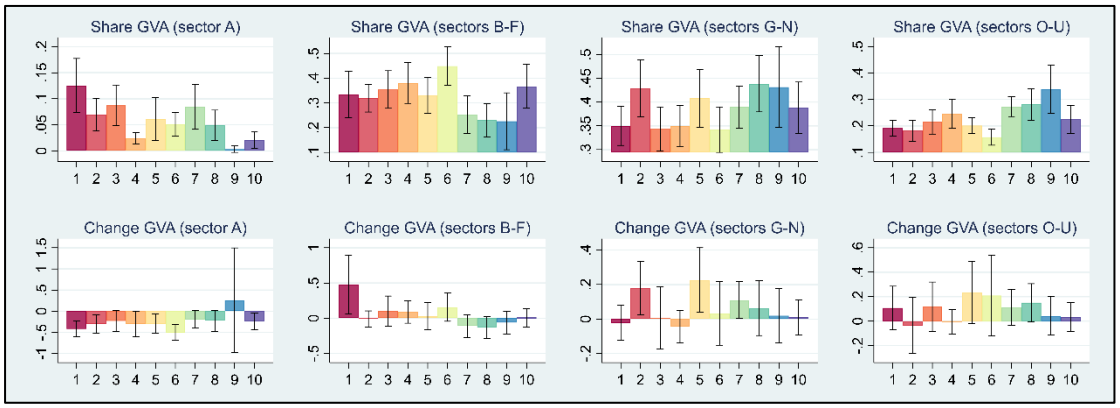


Table 32. Economic indicators: employment shares by sector, and their change (ten groups).

Groups	EMPAshare2016	EMPBFshare2016	EMPGNshare2016	EMPOUshare2016
1	0.29	0.27	0.24	0.20
2	0.13	0.29	0.32	0.26
3	0.16	0.31	0.28	0.25
4	0.03	0.33	0.33	0.31
5	0.21	0.28	0.30	0.21
6	0.13	0.39	0.29	0.19
7	0.18	0.19	0.32	0.31
8	0.10	0.21	0.36	0.34
9	0.00	0.18	0.43	0.38
10	0.03	0.31	0.35	0.31
Total	0.12	0.28	0.33	0.28
ANOVA	0.000	0.000	0.000	0.000
Groups	EMPArelch	EMPBFrelch	EMPGNrelch	EMPOUrelch
1	0.04	0.01	0.21	-0.05
2	-0.51	0.07	0.37	0.13
3	-0.33	-0.03	0.26	0.29
4	-0.15	-0.07	0.06	0.04
5	-0.31	0.10	0.36	0.33
6	-0.44	0.05	0.32	0.36
7	-0.15	-0.16	0.15	0.16
8	-0.15	-0.21	0.16	0.17
9	0.00	-0.15	0.07	0.02
10	-0.23	-0.10	0.08	0.08
Total	-0.23	-0.06	0.19	0.17
ANOVA	0.000	0.000	0.000	0.000

Figure 23. Economic indicators: employment shares by sector, and their change (ten groups).

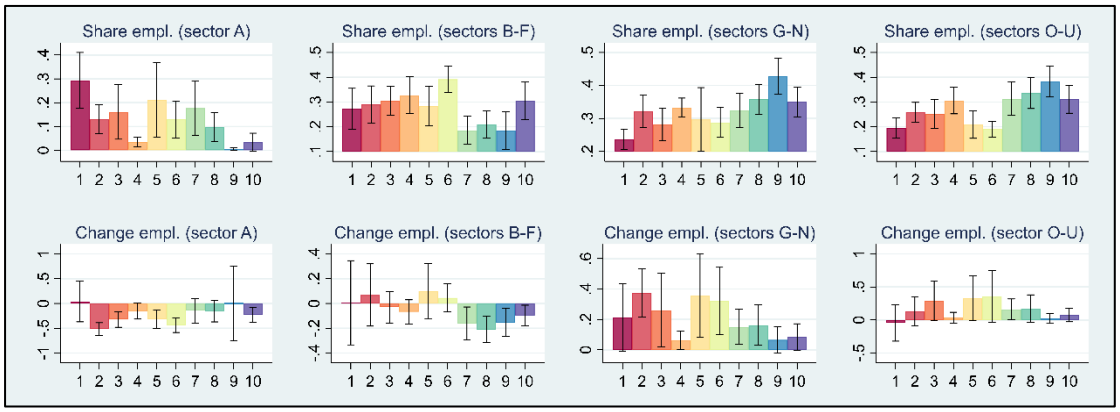


Table 33. Economic indicators: GVA per working unit by sector and convergence to national (ten groups).

Groups	prod_rel nat2016	prodA_ relnat2016	prodBF_ relnat2016	prodGN_ relnat2016	prodOU_ relnat2016
1	70.25	114.88	79.63	76.26	84.33
2	80.91	120.46	82.10	83.67	81.65
3	81.06	102.05	86.74	81.51	90.53
4	83.31	122.74	76.95	81.15	94.20
5	75.94	91.41	78.89	82.79	92.64
6	93.37	152.26	100.04	81.87	89.26
7	86.13	110.85	102.66	88.62	96.27
8	84.92	89.65	83.96	86.95	96.58
9	81.90	132.63	77.92	76.18	100.18
10	90.89	121.36	89.05	93.08	91.05
Total	84.31	112.70	86.74	85.29	92.44
ANOVA	0.000	0.000	0.000	0.000	0.000
Groups	ConvAbs NatProd	ConvAbs NatProdA	ConvAbs NatProdBF	ConvAbs NatProdGN	ConvAbs NatProdOU
1	-18.73	-20.53	1.80	-30.09	-2.42
2	-3.78	8.15	-6.16	-0.88	-6.36
3	-4.16	-3.46	-2.08	-15.03	-4.53
4	8.05	8.50	5.26	5.87	7.31
5	-1.03	-0.78	-7.93	-1.30	0.75
6	-4.94	11.45	8.37	-11.70	-4.62
7	-0.70	-4.56	-2.40	0.59	-0.32
8	-2.19	-9.57	-2.25	-0.84	-0.27
9	2.57	47.23	-5.17	5.45	5.42
10	1.54	15.87	-3.08	2.61	0.09
Total	-1.13	4.28	-1.64	-2.75	-0.20
ANOVA	0.000	0.000	0.008	0.000	0.000

Figure 24. Economic indicators: GVA per working unit by sector and convergence to national (ten groups).

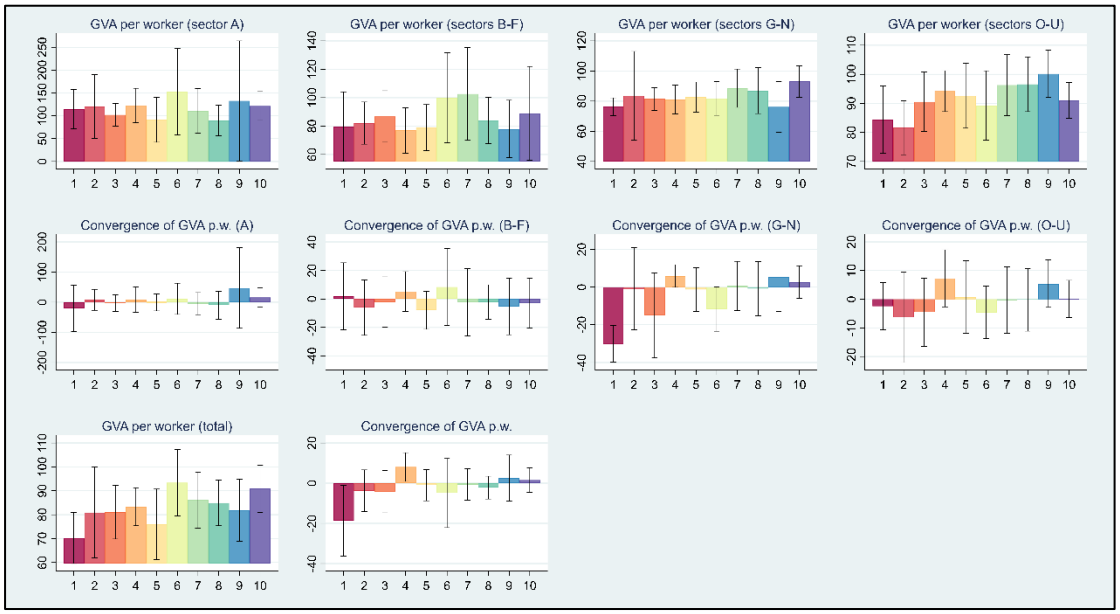


Table 34. Economic indicators: regional economic accounts (GDP and investments) (ten groups).

Groups	GDPpc_ PPS2016	GDPrel_ PPS2016	GDPrelnat _PPS2016	converg EU_abs	converg Nat_abs	invest_ on_gdp
1	8,783.33	29.98	60.09	5.98	-19.33	0.18
2	14,978.57	51.12	72.45	22.13	-5.38	0.19
3	13,602.38	46.42	68.11	7.19	-7.06	0.20
4	25,346.66	86.51	69.72	11.74	8.21	0.22
5	16,137.50	55.08	72.40	9.69	-4.73	0.17
6	16,210.00	55.32	85.44	19.01	-4.37	0.20
7	20,528.37	70.06	80.85	-4.21	4.05	0.18
8	19,854.72	67.76	73.05	-10.71	-2.23	0.19
9	39,729.41	135.60	109.45	6.73	3.26	0.22
10	28,336.47	96.71	79.96	3.62	1.86	0.21
Total	21034.27	71.79	76.37	4.89	-1.33	0.20
ANOVA	0.000	0.000	0.000	0.000	0.000	0.000

Figure 25. Economic indicators: regional economic accounts (GDP and investments) (ten groups).

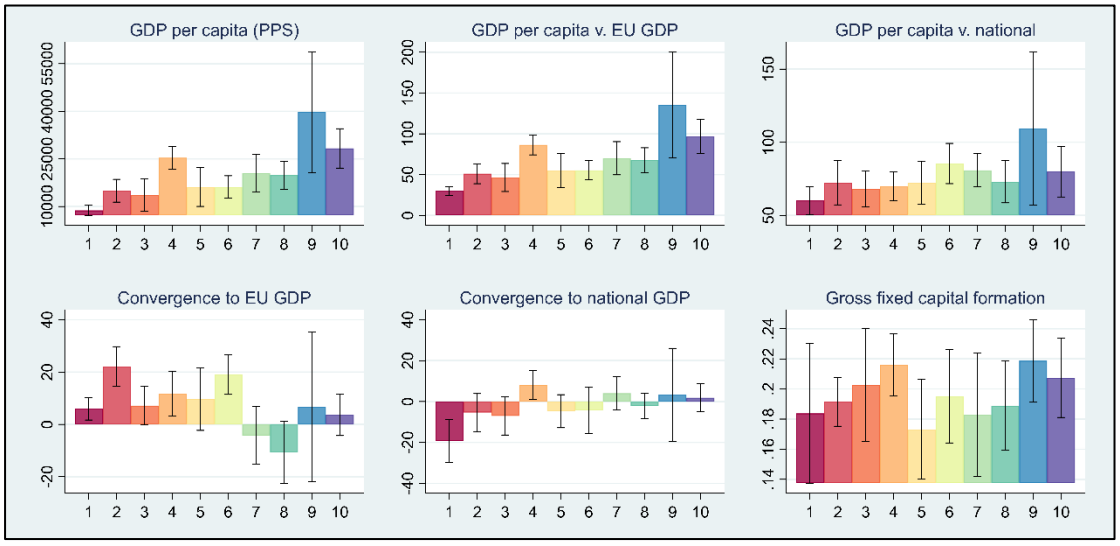


Table 35. Environmental indicators: land use, soil erosion, and their change (ten groups).

Groups	agri_land_2015	builtup_land_2015	unused_land_2015	erosion2016
1	83.77	2.36	11.82	3.57
2	88.23	3.55	6.10	1.53
3	83.48	3.90	10.25	3.33
4	81.93	9.12	4.04	2.27
5	81.61	4.01	11.94	5.47
6	87.66	3.51	6.31	3.57
7	67.38	4.65	25.31	3.56
8	72.67	4.49	19.37	7.56
9	78.24	10.65	5.13	1.58
10	79.95	9.29	4.80	3.37
Total	79.40	5.93	10.94	4.00
ANOVA	0.000	0.000	0.000	0.000
Groups	change_agri_land	change_builtup_land	change_unused_land	erosion_ch
1	-1.22	0.34	0.60	-0.66
2	-1.39	0.31	0.86	-0.04
3	-0.96	-0.16	1.11	-0.18
4	-1.81	1.82	-0.03	-1.01
5	-0.03	0.19	-0.08	-0.29
6	-0.54	0.05	0.25	-0.35
7	-0.90	0.50	0.51	-0.50
8	-2.28	0.35	1.81	-0.53
9	-2.06	0.99	0.43	-0.44
10	-1.13	0.34	0.32	-0.65
Total	-1.19	0.45	0.56	-0.50
ANOVA	0.001	0.000	0.002	0.000

Figure 26. Environmental indicators: land use, soil erosion, and their change (ten groups).

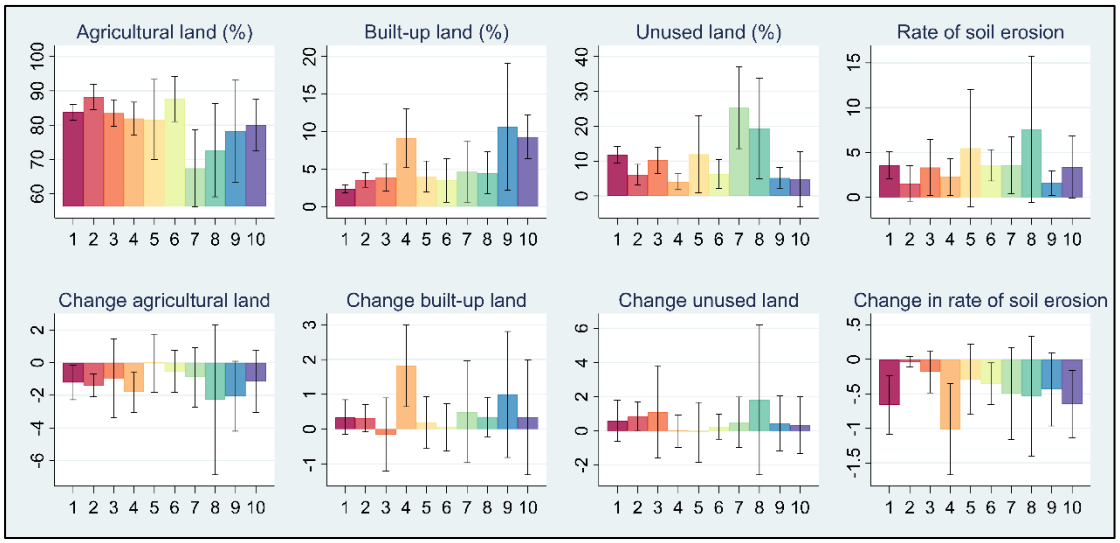
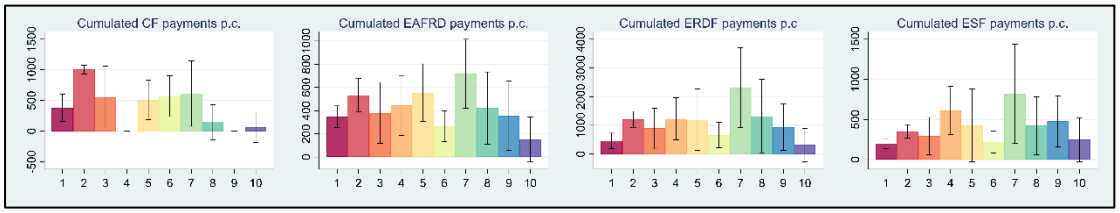


Table 36. Policy indicators: cumulated EU funds payments per capita 2000-2013 (ten groups).

Groups	paymentCF	paymentEAFRD	paymentERDF	paymentESF
1	382.87	347.59	460.88	200.16
2	1,004.84	532.41	1,204.37	350.63
3	554.57	380.26	894.95	294.11
4	0.00	445.58	1,224.86	612.29
5	511.74	553.75	1,191.26	425.67
6	571.15	265.45	661.34	219.60
7	614.83	718.62	2,306.67	819.53
8	145.07	421.57	1,313.82	421.82
9	0.00	356.09	933.60	478.08
10	62.54	152.46	312.88	247.52
Total	323.69	395.61	1,023.61	406.09
ANOVA	0.000	0.000	0.000	0.000

Figure 27. Policy indicators: cumulated EU funds payments per capita 2000-2013 (ten groups).



2.5 Selection of the final cluster and labelling

In this section, we zoom in on the five-cluster solution. We first identify the variables contributing most to differentiating the five groups, and then generate new five-cluster solutions considering separately the geographical (accessibility), demographic, and economic variables used in the main cluster analysis in section 2.4. The new clusters are used to refine the labels of the main cluster solution for the ESCAPE Final Report.

The contribution of each variable to differentiating the groups is assessed by calculating the variance *between* the groups as a share of the total variance (*between* and *within*). The rationale behind this choice is that, if the variance *between* the groups represents a larger percentage of the total, the cluster solution is partitioning the regions effectively in terms of this variables. This information is shown in Table 37, where the p-values of ANOVA tests for each variable are also displayed. The variables not used in the clustering process are tabled too. We observe that the cluster solution is differentiating effectively the NUTS3 regions also in terms of these variables, i.e. new cleavages emerge endogenously. In turn, the fact that some variables are used in the clustering process does not guarantee that the output explains a larger share of their variance. The most "relevant" variable is **accessibility**, followed by the **post-socialist** condition, whereas other geographical variables are less important. The partition also explain over 50% of the variance in the **share of population living in shrinking LAUs** and in the **rate of shrinking in 2001-2016**. The share of variation of economic indicators explained is smaller, overcoming 40% only for the **GDP per capita**, the **share of public employment**, and the **change in the agricultural sector's GVA**. Among the environmental variables, the share of built-up land stands out.

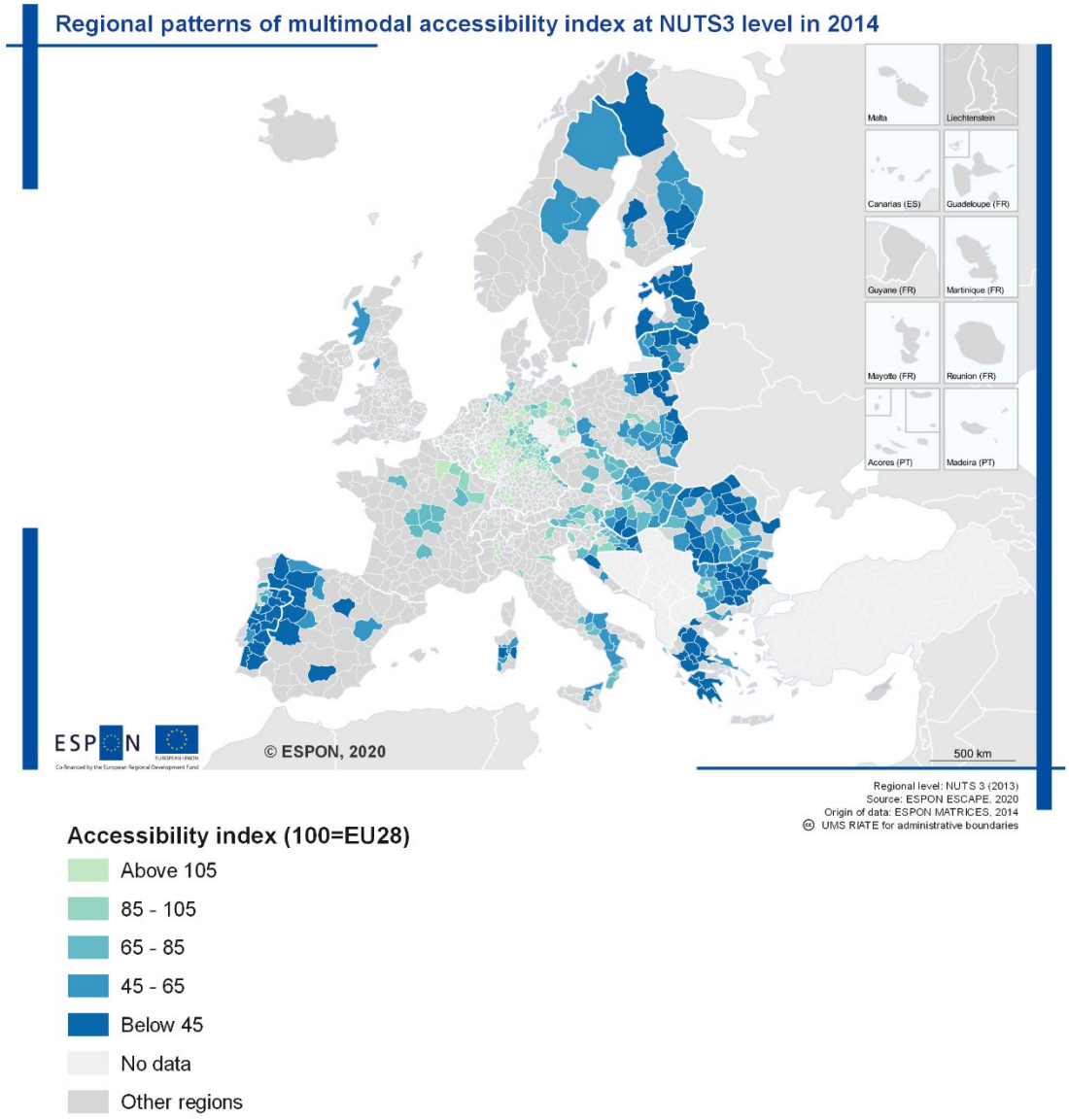
Table 37. Share of variance of all variables explained by the five-cluster solution.

Variable	p-value (ANOVA)	Explained var. (%)	Variable	p-value (ANOVA)	Explained var. (%)
MM_Ind_2014	0.0000	62.0%	paymentEAFRD	0.0000	20.4%
post_socialist	0.0000	58.2%	pop_density	0.0000	19.7%
share_shrinking	0.0000	51.0%	border_region	0.0000	17.4%
rate_shr_01_16	0.0000	50.7%	ConvAbsNatProd	0.0000	16.5%
GDPpc_PPS2016	0.0000	48.3%	nuts3_st_dev	0.0000	16.2%
GDPrel_PPS2016	0.0000	48.3%	EMPOUrelch	0.0000	16.1%
nuts3_shrink_gap	0.0000	47.1%	change_builtup_land	0.0000	14.5%
pop_change_93_33	0.0000	45.3%	COASTAL_share	0.0000	14.0%
decad_shrink	0.0000	44.2%	external_border	0.0000	13.4%
EMPOUshare2016	0.0000	43.8%	paymentESF	0.0000	13.2%
net_mig_01_16	0.0000	43.1%	GVAOUrelch	0.0000	13.2%
GVAAshare2016	0.0000	40.8%	invest_on_gdp	0.0000	12.9%
pop_change_13_33	0.0000	40.4%	GVAGNshare2016	0.0000	12.8%
builtup_land_2015	0.0000	39.0%	erosion_ch	0.0000	12.6%
pop_change_93_13	0.0000	37.9%	GVAGNrelch	0.0000	11.4%
unused_land_2015	0.0000	36.0%	GDPrelnat_PPS2016	0.0000	10.6%
POP16_64_share_16	0.0000	35.8%	prodOU_relnat2016	0.0000	9.4%
convergEU_abs	0.0000	32.7%	ConvAbsNatProdOU	0.0000	9.3%
EMPAshare2016	0.0000	32.7%	mountain_pop	0.0000	8.9%
nat_ch_01_16	0.0000	30.8%	prod_relnat2016	0.0000	8.5%
paymentCF	0.0000	29.6%	prodGN_relnat2016	0.0000	8.4%
EMPBFrelch	0.0000	28.7%	EMPArelch	0.0000	8.3%
GVAOUshare2016	0.0000	28.5%	erosion2016	0.0000	7.1%
EMPGNrelch	0.0000	28.2%	ConvAbsNatProdA	0.0004	5.2%
EMPBFshare2016	0.0000	28.2%	ISLAND	0.0006	5.1%
Gini_2011	0.0000	27.9%	change_agri_land	0.0009	5.0%
GVABFshare2016	0.0000	26.0%	GVAArelch	0.0008	4.9%
agri_land_2015	0.0000	25.2%	metro_region	0.0008	4.9%
EMPGNshare2016	0.0000	24.4%	change_unused_land	0.0017	4.7%
access_ch_00_14	0.0000	24.0%	deg_urb	0.0048	3.9%
convergNat_abs	0.0000	23.9%	mountain_area	0.0083	3.6%
ConvAbsNatProdGN	0.0000	21.7%	prodA_relnat2016	0.0235	2.9%
change_Gini	0.0000	21.2%	prodBF_relnat2016	0.0342	2.7%
paymentERDF	0.0000	20.7%	ConvAbsNatProdBF	0.1798	1.6%
GVABFrelch	0.0000	20.7%	capital_metro	0.4236	1.0%

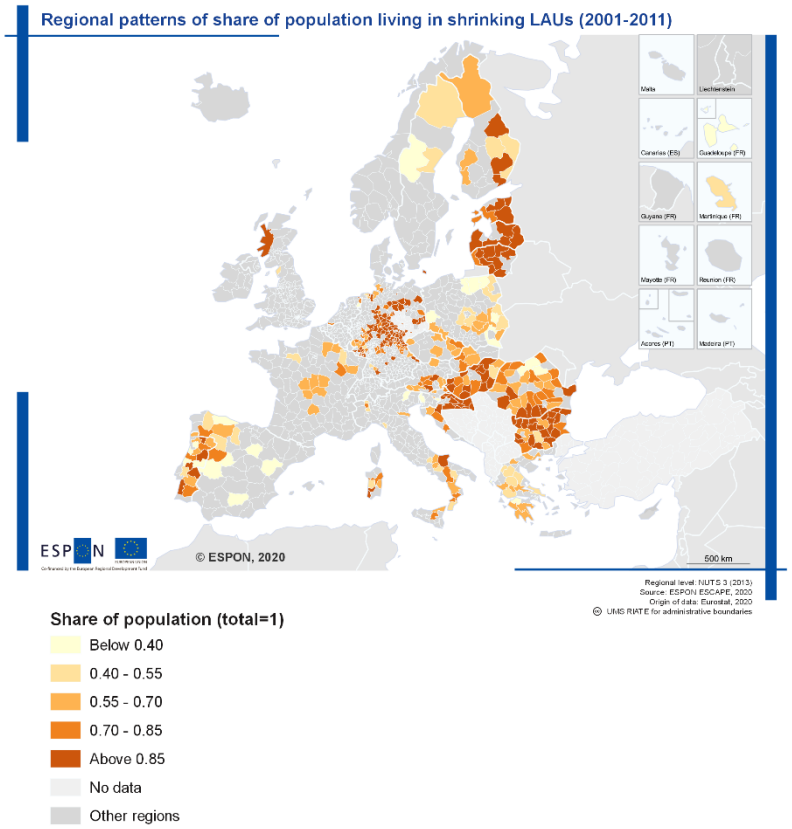
Notes: The 29 variables used in the clustering process are highlighted in grey; those which do not differ significantly between the groups at the 1% level are in dark red.

The variables (of the 29 variables used in the main cluster solution) with a share above 40% of their variance explained by the cluster partition are mapped from Map 14 to Map 20. These mapped patterns underline regional differences between shrinking rural regions that are related to centre *vs.* periphery, East *vs.* West, and the inner diversity of these groups.

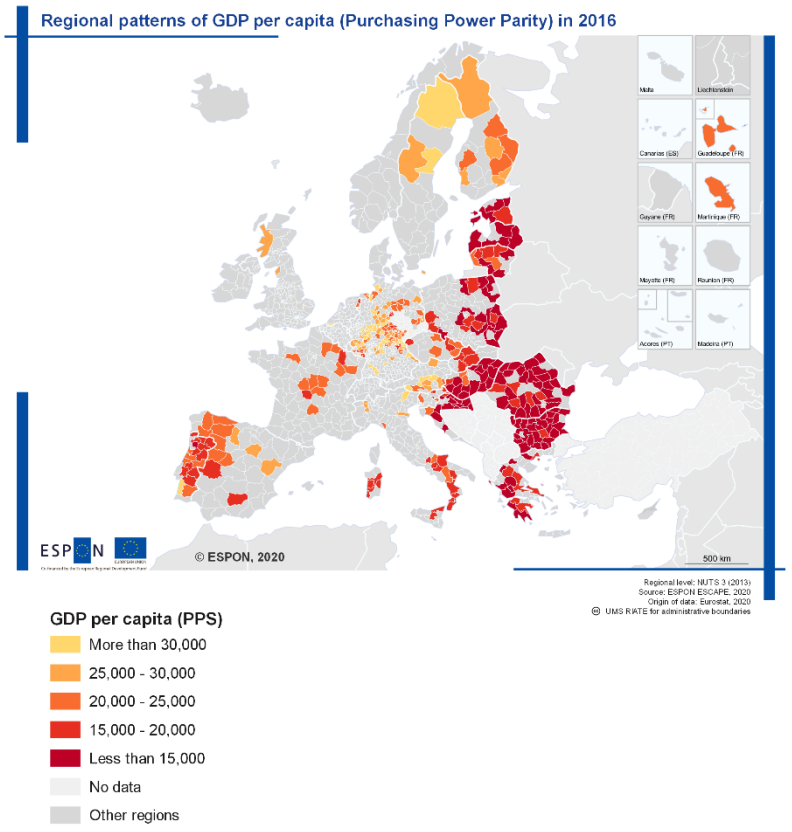
Map 14: Regional patterns of multimodal accessibility index at NUTS3 level in 2014



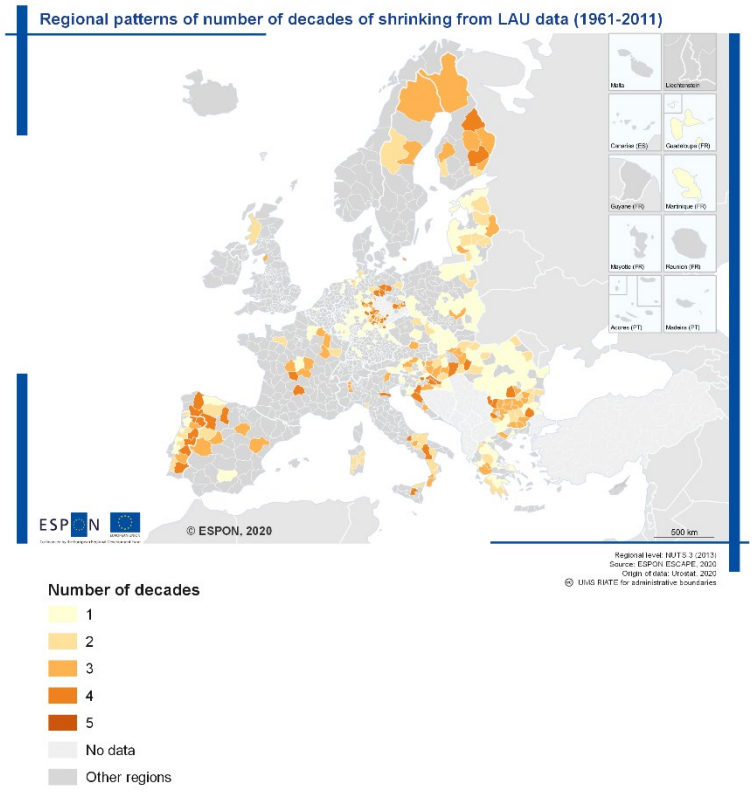
Map 15: Regional patterns of the share of population living in shrinking LAUs (2001-2011)



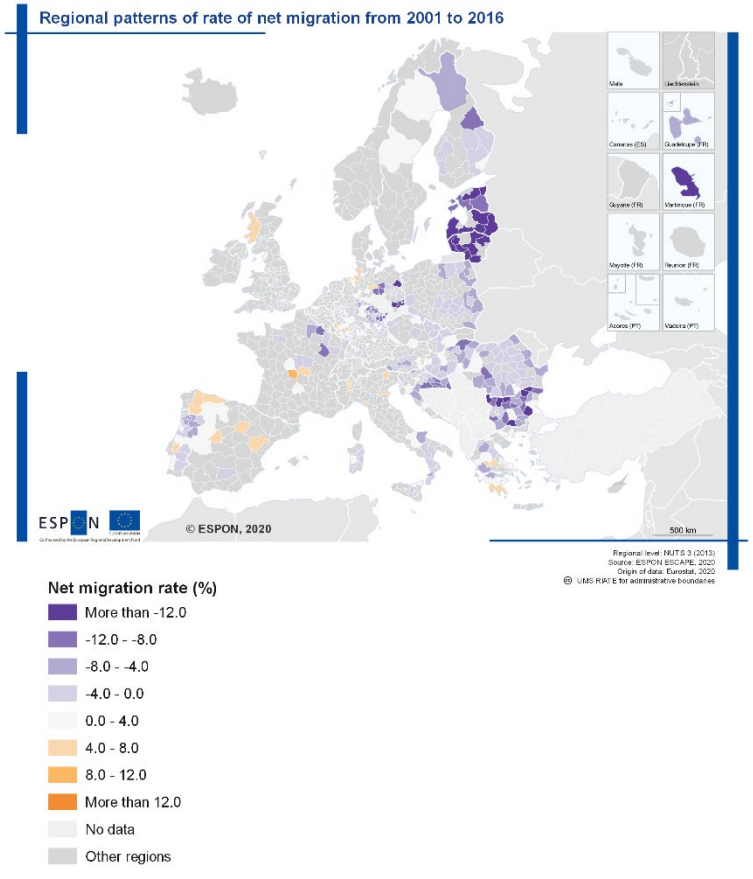
Map 16: Regional patterns of GDP per capita (PPS) in 2016



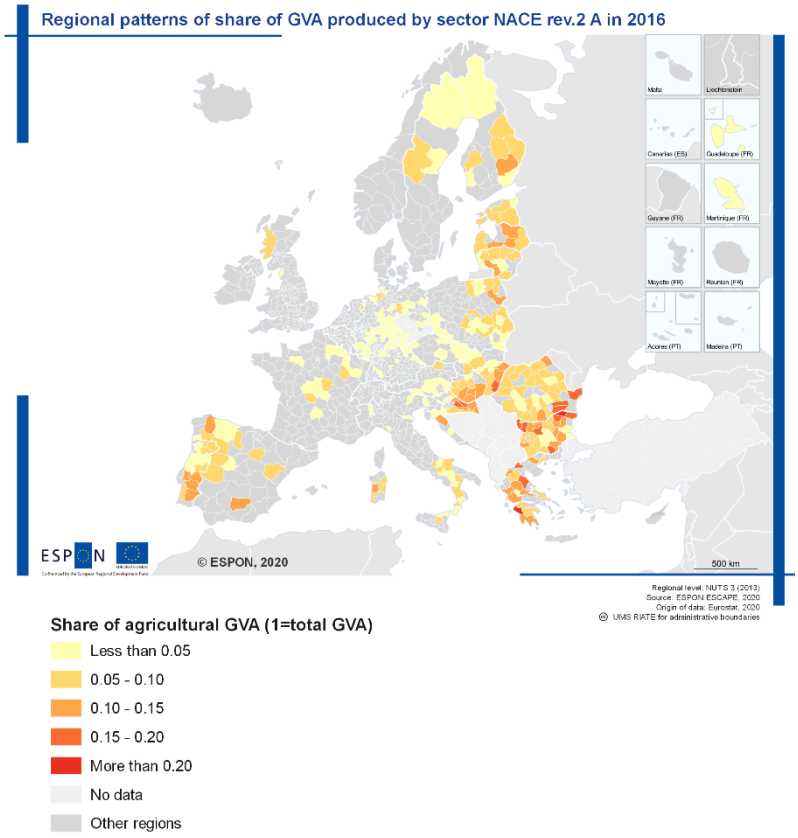
Map 17: Regional patterns of the number of decades of shrinking from LAU data (1961-2011)



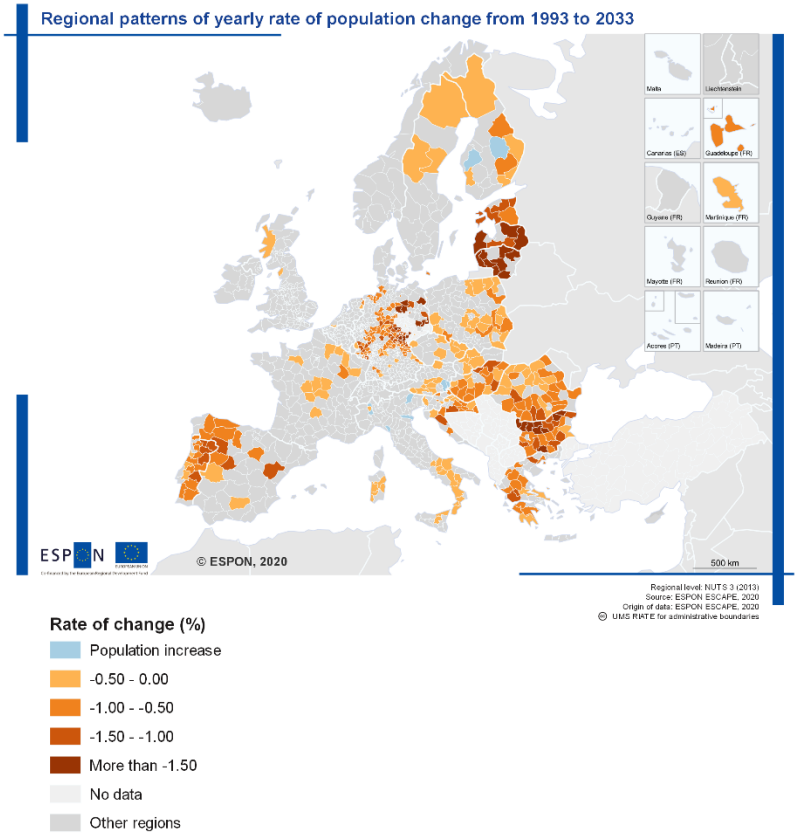
Map 18: Regional patterns of the rate of net migration from 2001 to 2016



Map 19: Regional patterns of the share of GVA produced by the agricultural sector in 2016



Map 20: Regional patterns of the yearly rate of population change from 2013 to 2033



The 29 variables used in the main clustering exercise were split into geography (two variables), demography (10), and economy (17). A *Ward's linkage* clustering algorithm was applied to each of the three groups; the five-cluster solutions were retained (regardless of the indication provided by the Calinski-Harabasz pseudo-F stopping rule, which suggested two clusters for geography and demography, and three for economy); and labels were assigned the groups obtained. Table 38 to Table 40 illustrate the values assumed in each group by all the variables belonging to the category used in the cluster partition, and present the labels assigned to the single groups (also mapped on Map 21, Map 22, and Map 23).

Map 21: Clusters obtained using geographical variables only

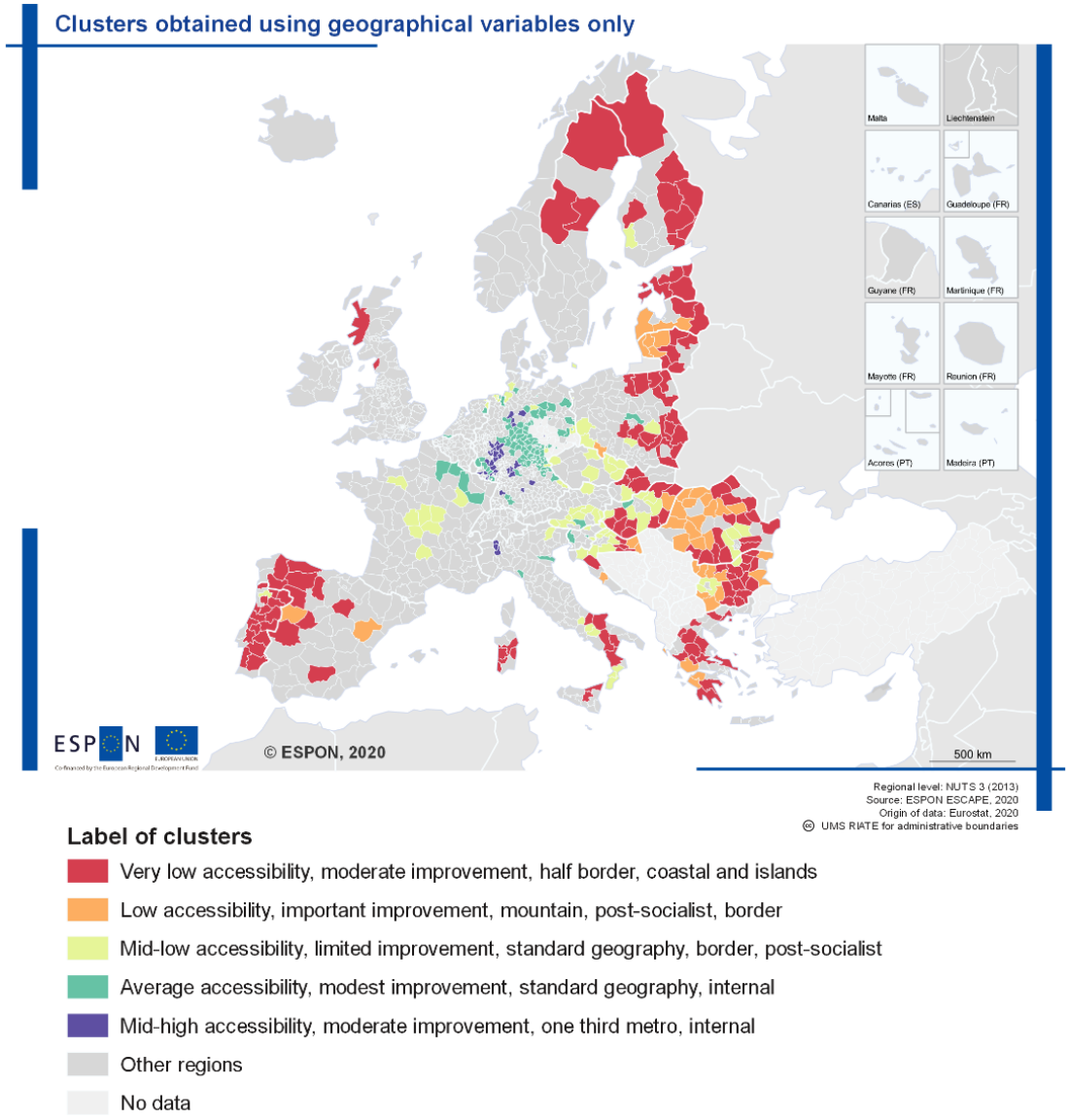


Table 38. Mean value of all the geographical variables in the clusters obtained using the geographical variables only, and resulting labels.

Geography	deg_urb	ISLAND	metro_region	capital_metro	COASTAL_share	mountain_area
1	0.635	0.255	0.088	0.000	26.672	0.226
2	0.475	0.075	0.050	0.000	21.100	0.250
3	0.587	0.013	0.080	0.053	20.293	0.267
4	0.573	0.000	0.177	0.010	10.073	0.135
5	0.343	0.000	0.314	0.000	0.000	0.171
Geography	mountain_pop	post_socialist	border_region	external_border	access_ch_00_14	MM_Ind_2014
1	0.380	0.526	0.555	0.307	24.698	43.158
2	0.425	0.850	0.650	0.350	66.255	47.570
3	0.360	0.507	0.560	0.067	25.974	75.998
4	0.198	0.375	0.271	0.010	15.343	98.254
5	0.200	0.029	0.257	0.057	21.131	126.200
Geography	**Labels**					
1	very low accessibility, moderate improvement, half border, coastal and islands (137 regions, 35.8%)					
2	low accessibility, important improvement, mountain, post-socialist, border (40 regions, 10.4%)					
3	mid-low accessibility, limited improvement, standard geography, border, post-socialist (75 regions, 19.6%)					
4	average accessibility, modest improvement, standard geography, internal (96 regions, 25.1%)					
5	mid-high accessibility, moderate improvement, one third metro, internal (35 regions, 9.1%)					
Note: The variables used in the clustering process (a subset of the 29 variables used in the main cluster) are highlighted in grey.						

Table 39. Mean value of all the demographic variables in the clusters obtained using the demographic variables only, and resulting labels.

Demography	decad_shrink	Gini_2011	change_Gini	nuts3_shrink_gap	nuts3_st_dev	share_shrinking	pop_density
1	3.664	0.563	0.010	0.096	0.069	0.941	67.121
2	3.238	0.013	0.000	0.069	0.002	0.993	701.004
3	3.121	0.603	0.018	0.047	0.096	0.593	70.954
4	1.660	0.450	0.000	0.034	0.045	0.766	122.905
5	0.500	0.438	0.010	0.015	0.066	0.285	188.009
Demography	POP16_64_share_16	rate_shr_01_16	nat_ch_01_16	net_mig_01_16	pop_change_93_33	pop_change_93_13	pop_change_13_33
1	0.629	-16.865	-8.920	-7.945	-1.058	-0.926	-1.189
2	0.631	-5.993	-7.287	1.294	-0.648	-0.674	-0.622
3	0.635	-5.092	-5.168	0.076	-0.382	-0.289	-0.474
4	0.651	-4.038	-3.885	-0.152	-0.357	-0.140	-0.573
5	0.666	-1.752	0.898	-2.616	-0.122	0.100	-0.344
Demography	**Labels**						
1	long-term, worsening, severe legacy, and severe active shrinking (128 regions, 33.3%)						
2	long-term, stable, severe legacy shrinking with positive migration (21 regions, 5.5%)						
3	long-term, stable, moderate legacy shrinking and zero migration (116 regions, 30.1%)						
4	mid-term, worsening, moderate legacy, and modest active shrinking (100 regions, 26.0%)						
5	recent, worsening, positive natural change, and modest active shrinking (20 regions, 5.2%)						
Note: The variables used in the clustering process (a subset of the 29 variables used in the main cluster) are highlighted in grey.							

Map 22: Clusters obtained using demographic variables only

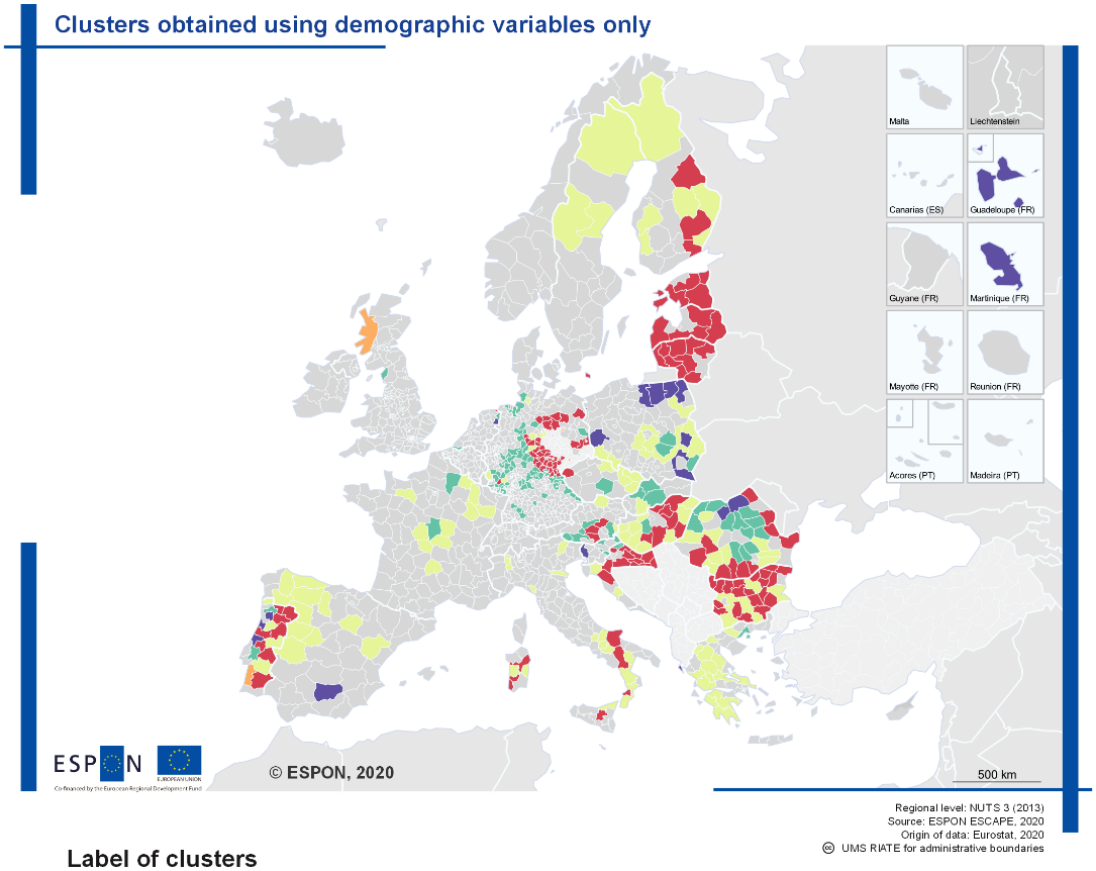


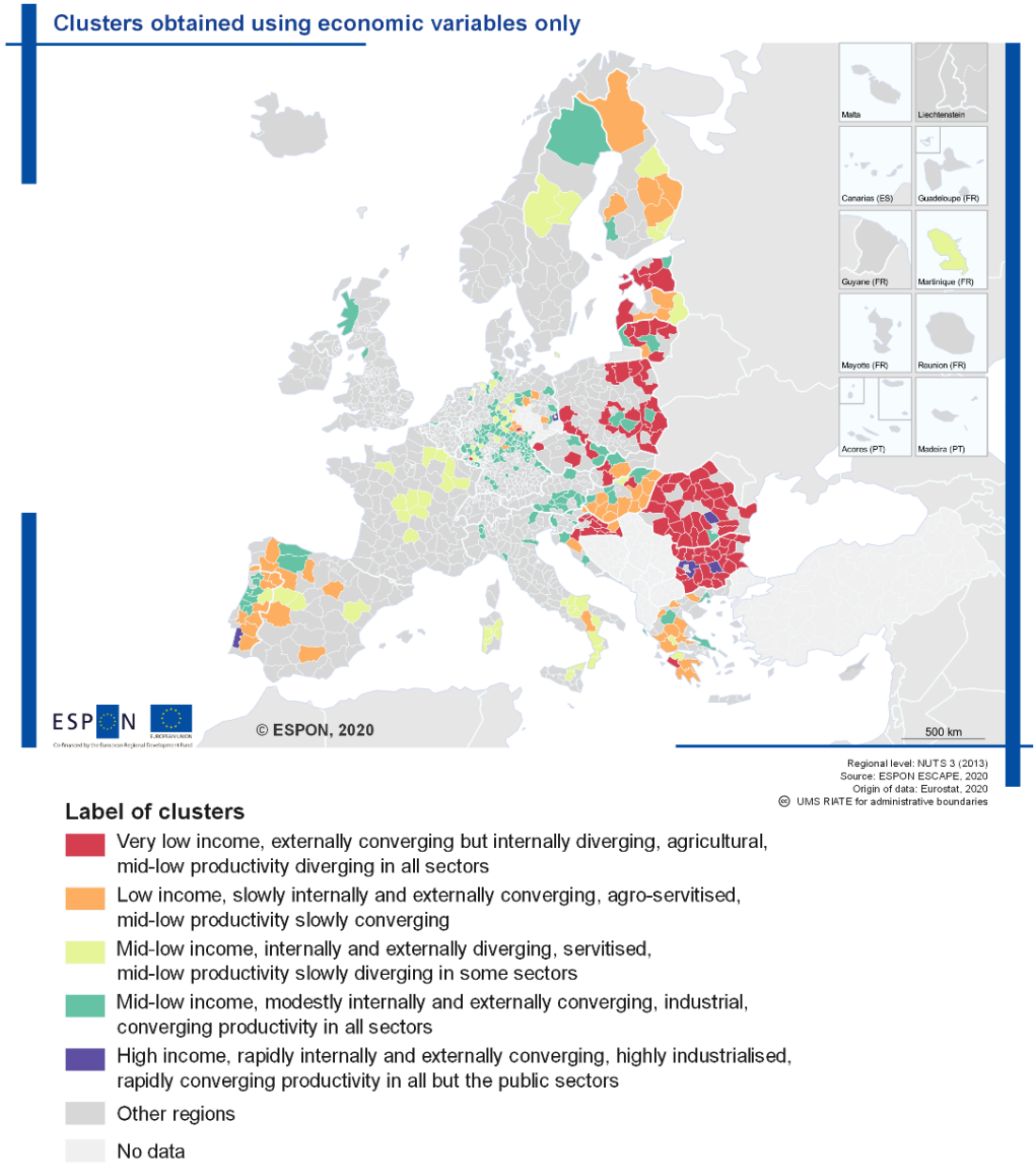
Table 40. Mean value of all the economic variables in the clusters obtained using the economic variables only, and resulting labels.

Economy	GVAAshare2016	EMPA-share2016	GVABFshare2016	EMPBF-share2016	GVAGNshare2016	EMPGNshare2016	GVAOUshare2016
1	0.085	0.226	0.350	0.306	0.374	0.263	0.192
2	0.086	0.152	0.279	0.228	0.371	0.319	0.264
3	0.035	0.061	0.221	0.192	0.421	0.367	0.323
4	0.024	0.049	0.380	0.323	0.391	0.351	0.205
5	0.026	0.102	0.552	0.353	0.293	0.317	0.128
Economy	EMPOUshare2016	GDPpc_PPS2016	GDPrel_PPS2016	GDPrelnat_PPS2016	convergEU_abs	convergNat_abs	GVAArelch
1	0.205	12490.291	42.629	67.823	12.268	-10.610	-0.395
2	0.301	18267.797	62.347	74.101	2.373	3.194	-0.222
3	0.380	23317.134	79.581	71.953	-7.817	-3.162	-0.099
4	0.278	26183.748	89.364	82.231	5.784	3.279	-0.246
5	0.229	41837.500	142.790	146.105	36.601	25.567	-0.437
Economy	EMPArelch	GVABFrelch	EMPBFrelch	GVAGNrelch	EMPGNrelch	GVAOUrelch	EMPOUrelch
1	-0.320	0.176	0.103	0.104	0.362	0.215	0.295
2	-0.243	-0.012	-0.139	0.051	0.172	0.068	0.157
3	-0.095	-0.142	-0.185	0.044	0.084	0.138	0.100
4	-0.222	0.016	-0.093	0.020	0.118	0.023	0.107
5	-0.235	0.209	-0.024	-0.088	0.153	-0.175	0.095
Economy	prod_relnat2016	prodA_relnat2016	prodBF_relnat2016	prodGN_relnat2016	prodOU_relnat2016	ConvAbsNatProd	ConvAbsNatProdA
1	75.747	117.931	79.741	80.197	88.286	-9.233	-1.041
2	84.501	115.858	94.201	86.021	96.250	2.008	-2.636
3	80.772	100.041	77.492	81.679	96.408	-2.125	5.497
4	90.563	109.843	89.045	90.584	91.948	3.048	7.388
5	121.428	186.891	172.643	90.800	87.735	19.113	52.536

Economy	ConvAbsNatProdBF	ConvAbsNatProdGN	ConvAbsNatProdOU	invest_on_gdp	**Labels**
1	-5.921	-17.474	-4.145	0.181	very low income, externally converging but internally diverging, agricultural, mid-low productivity diverging in all sectors (103 regions, 26.8%)
2	3.941	0.613	1.925	0.193	low income, slowly internally and externally converging, agro-servitised, mid-low productivity slowly converging (59 regions, 15.4%)
3	-9.390	1.865	1.743	0.203	mid-low income, internally and externally diverging, servitised, mid-low productivity slowly diverging in some sectors (78 regions, 20.3%)
4	0.819	2.147	0.511	0.206	mid-low income, modestly internally and externally converging, industrial, converging productivity in all sectors (136 regions, 35.4%)
5	41.744	5.876	-1.801	0.189	high income, rapidly internally and externally converging, highly industrialised, rapidly converging productivity in all but the public sectors (8 regions, 2.1%)

Note: The variables used in the clustering process (a subset of the 29 variables used in the main cluster) are highlighted in grey.

Map 23: Clusters obtained using economic variables only



As a next step, the three above clusters were cross-tabulated with the five-cluster solution presented in section 2.4.2 (see Table 41). For each group of the 2.4.2 cluster partition, the groups of each of the "partial" clusters to which most of its regions belong (highlighted in dark grey in Table 41) were identified. Based on the labels assigned to these latter groups in Tables 38 to 40, a new label was generated for each of the groups of the main cluster solution, and was then used to review the label assigned in Table 17 of section 2.4.2. The "aggregated" labels generated using single-category clusters, and the final, reviewed labels, are reported in Table 42.

Table 41. Cross-tabulation of the full five-cluster solution with the groups generated using variables related to a single category.

Full cluster	Geography					Demography					Economics				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1	40	18	15	1	0	62	0	12	0	0	49	15	2	8	0
2	0	0	4	34	0	36	0	1	1	0	1	7	5	24	1
3	37	14	24	3	0	5	0	27	29	17	50	2	0	23	3
4	58	8	20	6	2	19	0	70	4	1	2	32	40	20	0
5	2	0	12	52	33	6	21	6	66	0	1	3	30	61	4
Total	137	40	75	96	35	128	21	116	100	18	103	59	77	136	8

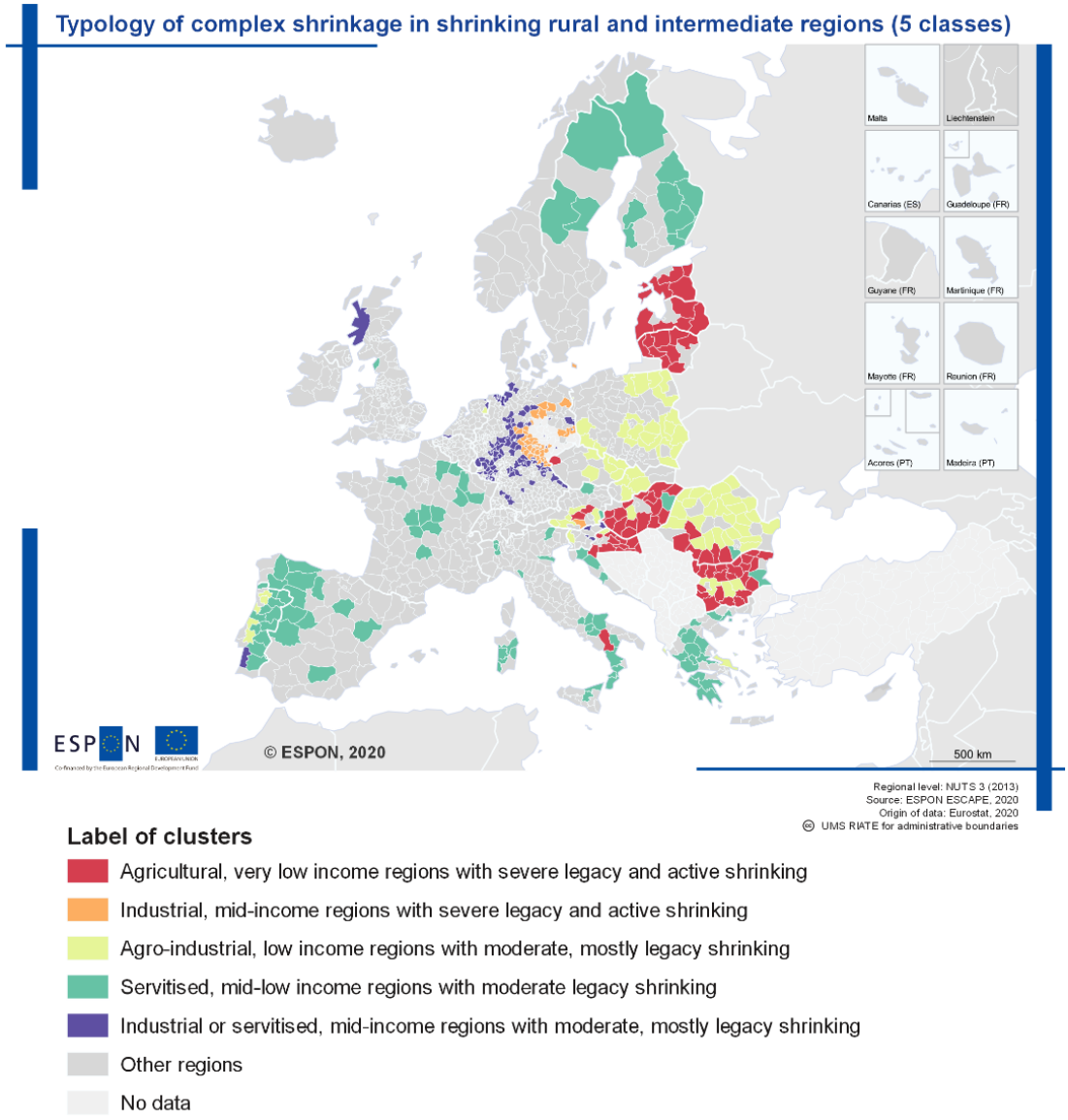
Note: The numbers in the internal cells are NUTS3 regions. For each group of the "full" cluster, the groups of each of the partial clusters to which most of its NUTS3 regions belong are highlighted in grey.

The whole exercise was aimed at cross-checking the coherence of the labels adopted in section2.4.2 for the main five-cluster solution by observing how the regions are distributed with respect to specific categories of variables. Indeed, a labelling process based on average values is prone to biases. The labels reviewed according to this procedure are reported in Chapter 4 of the ESCAPE Final Report (as represented in Map 24).

Table 42. Labels for the five-cluster solution presented in section 2.4.2.

Full cluster	Aggregated label (geography, demography, economics)	Reviewed label for the ESCAPE Final Report
1	Agricultural, very low income regions with severe legacy and active shrinking	Agricultural, very low income regions with severe legacy and active shrinking
2	Industrial, mid-low income regions with severe legacy and active shrinking	Industrial, mid-income regions with severe legacy and active shrinking
3	Agricultural, very low income regions with moderate, mostly legacy shrinking	Agro-industrial, low income regions with moderate, mostly legacy shrinking
4	Servitised, mid-low income regions with moderate legacy shrinking	Servitised, mid-low income regions with moderate legacy shrinking
5	Industrial, mid-income regions with moderate, mostly legacy shrinking	Industrial or servitised, mid-income regions with moderate, mostly legacy shrinking

Map 24: Typology of complex shrinking in shrinking rural and intermediate regions (5 classes) – short labels



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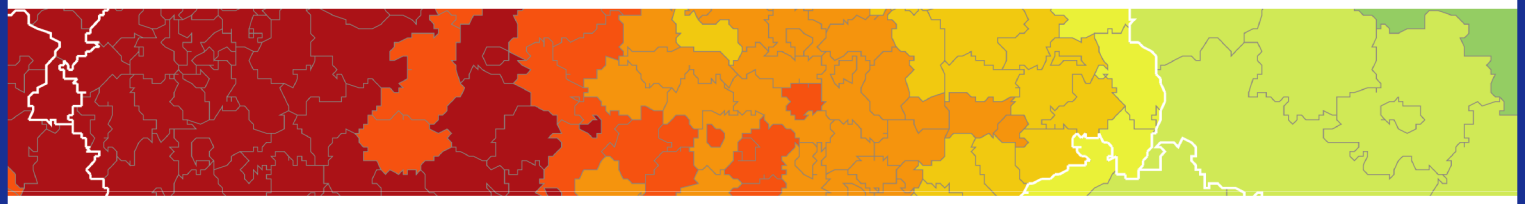

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