Thinking Spatially:
A Demographic Classification of European Regions

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Abstract

Spatial demography does not often play a leading role at the stage of population studies, as spatial thinking per se is not an exclusive concern of social scientists. Without a spatial thinking, we miss visual power, spatial observatory investigation, and understanding of the impacts that space can have on societies and individuals (CALDAS DE CASTRO 2007). There has been considerable interest among demographers in cross-national comparative studies, but only little research was done in cross-regional demographic analysis. This paper is looking beyond the horizon of the state of demography of nation states and focuses on smaller spatial aggregations within a supra-national scale, i.e. regions of the European Union at NUTS 2 level. The European Union's Community Policies identified the ongoing demographic changes as one of the main future challenges in the context of social and economic cohesion (EC 2008). Therefore, it is necessary to identify types of regions that share common development challenges and are affected most (positively or negatively) by certain demographic structures, trends and perspectives. In order to approach the question of *"how the demographic development, i.e. natural development of population as well as migration, will affect different types of regions and cities?"* we developed a typology of the demographic status of European regions and used the classification achieved by cluster analysis as a starting point for analysing the European Labour Force Survey (LFS). For policy makers and researchers interested in regional demographic and socio-economic differences, this information might be a useful addition to perspectives (often) focused exclusively on the state of nation states.

EXTENDED ABSTRACT

Introduction

Europe is a continent of rich territory diversity implicating manifold assets and challenges. On the one hand, the positive assets can contribute to consolidate and progress Europe's position as a competitive, attractive and liveable place, on the other hand, its diversity – especially in the form of disparities – constitutes a challenge to European efforts to strengthen economic and social cohesion and integration. From a European perspective, understanding the position of each region in comparison with other regions is an important aspect in identifying the need for action. For policy makers, the territorial dimension is important to design integrated European policy approaches, with objectives on cohesion, competitiveness and territorial cooperation. With respect to territorial cohesion, i.e. the territorial perspective of economic and social cohesion, the need for solid and comparable regionalised information is evident (EC 2007; EC 2008).

This paper is looking beyond the horizon of the state of demography of nation states and focuses on smaller spatial aggregations within a supra-national scale, i.e. regions of the European Union at NUTS 2 level. The European Union's Community Policies identified the ongoing demographic changes as one of the main future challenges in the context of social and economic cohesion (EC 2008). Thus, the European Spatial Planning Observation Network (ESPON) originated a research project called DEMIFER – Demographic and Migratory Flows Affecting European Regions and Cities. The recent ESPON 2013 Programme is aiming to support the reinforcement of regional policy with studies, data and observations of development trends.

Research under the ESPON banner is demand-driven and is claiming a strong usability. Consequently, the research activities are orientated towards the actual policy demand and its results and outputs shall be made available to potential users, i.e. policy makers and practitioners at EU and Member State levels, as well as research institutes and universities (ESPON 2007). The research and policy questions DEMIFER is addressing involve, among others, the effects of future demographic developments (i.e. natural population development, as well as migration and age structural dynamics) and the so related changes in the labour force in different kind of regions.

In order to approach the question of *"how the demographic development will affect different types of regions and cities?"* we developed a typology of the demographic status of European regions and used the classification achieved by cluster analysis as a starting point for analysing the European Labour Force Survey (EU-LFS).

Data and Methodology

For the development of the demographic typology we used the following variables with good reason. Two different age groups were included namely the young adults (20 to 39 years) and the elder population (65 years and older). These age groups reflect (roughly) a generation step, whereas the 20 to 39 age group matches the prime age of childbearing as well as mobility and the age group 65+ indicates the stage of ageing. Looking beyond a strictly demographic point of view the (share of the) 20 to 39 years age group characterises each region in terms of the (potential) economically

active population. In general, a high proportion indicates a situation where either labour or (potential) labour force is a sufficient resource. The two other variables used in the cluster analysis represent the population development by components: the natural population increase and net migration.

We used a hierarchical cluster analysis to gain an overview about the similarity of the regional units and to extract a starting configuration of cluster centres, which were improved by a non-hierarchical cluster procedure (VICKERS et al. 2005; ESPON 2009). For the hierarchical cluster analysis the Ward method was applied, which combines clusters aiming to minimise the increase of the error sum of squares. The resulting classification was illustrated by more (and more refined) indicators, which were not included in the cluster analyses as input variables. Additionally, we used the European Labour Force Survey (LFS) for a further illustration of the classification result.

Results

As a result we achieved a classification of European regions based on the demographic status (2005) and short-term trends (2001-2005) – see Map 1. The spatial scope is covering the entire ESPON territory, i.e. the present 27 EU Member States and the four EFTA countries Iceland, Liechtenstein, Norway and Switzerland (EU27+4). On the regional level NUTS 2 is the focus of this spatial analysis. For a better illustration of the typology, the cluster profiles are portrayed by radar charts (see Fig. 1) featuring the standardised values of each variable used in the cluster analysis.

The typology (of 286 regions) reveals seven types of regions of distinctive demographic characteristics. Type 1 "Euro Standard" (N=79) is relatively close to the overall (EU27+4) average in respect to the variables used for this classification. The demographic profile shows a stagnation of the natural increase, but a positive net migration. The second type, "Challenge of Labour Force" (N=61), can be characterised by its high share of young adults, generating a challenge to bring and establish these young people into the labour force. The title of Type 3 "Family Potentials" (N=55) refers to the relatively young age structure and the high natural population increase between 2001 and 2005. Type 4 "Challenge of Ageing" (N=33) can be distinguished from the others by its high proportion of elderly people (aged 65 years and older). It also features a slightly negative natural population balance (albeit a high share of young adults in the reproductive age) and a strong in-migration surplus. The title of Type 5 "Challenge of Decline" (N=38) refers to a negative population development, driven by a negative natural population balance as well as a negative net migration rate. Together this leads to a significant population decrease coupled with population ageing. Type 6 "Young Potentials" (N=15) can be characterised by its young age structure and a strictly positive population development of both components: a positive natural increase and a positive net migration. The title of Type 7 "Overseas" reflects the geographical position of these five regions, which are all situated outside of the European mainland.

Furthermore, the typology reveals spatial pattern with respect to the geographical distribution of the different types of regions, i.e. distinctive Northern and Western European types (Type 1 and 3), Eastern European types (Type 2 and 5) and Southern European types (Type 4 and 6) as well as a non-European mainland type (Type 7).

The linkage of the demographic typology with LFS data (contributing regional indicators like labour force participation, unemployment rate, GDP level and growth, educational composition of the population, migration stocks by origin, etc.) offers new insights how demographic developments are affecting different types of European regions.

Summary and Discussion

The newly developed typology is a comprehensive classification of the demographic structure and short-term trends in the EU27+4. The typology enables users to capture the demographic diversity of European regions by 2005 at first glance. This demographic classification serves as a basis for the models, projections and case studies of the DEMIFER project, which were elaborated subsequently. The different types of regions resulting from the demographic typology were applied as input and output areas to policy scenarios, models and projections. The policy scenarios combine current demographic trends with the impacts of policies, which in turn influence those trends. Beyond that, case studies will be elaborated, utilising at least one region from every type of the Demographic Typology.

For sure, the method of using the EU-LFS 2007 data proves to be an innovative approach to link the Demographic Typology with socio-economic data. Our aim is to examine the relation between demography and economy, based on a demographic classification of European NUTS regions. In this respect, our approach allows us to examine the relationship between demo-graphic and socio-economic differences for each type of region.

Because of the given data situation, the final classification was elaborated on NUTS 2 level, although NUTS 3 would have been preferable from the analytical point of view. With respect to the spatial resolution of NUTS 2, it was not possible to detect smaller scaled spatial pattern like urban areas. Especially an inclusion of cities would broaden the analytical value of the classification.

This analysis demonstrates the purposes of spatial thinking: the descriptive function, i.e. the visual power of maps; the analytical function describing the distribution of a variable; and the inferential function dealing with how and why a spatial pattern is observed (cf. CALDAS DE CASTRO 2007).

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Typology of the Demographic Status (2005)
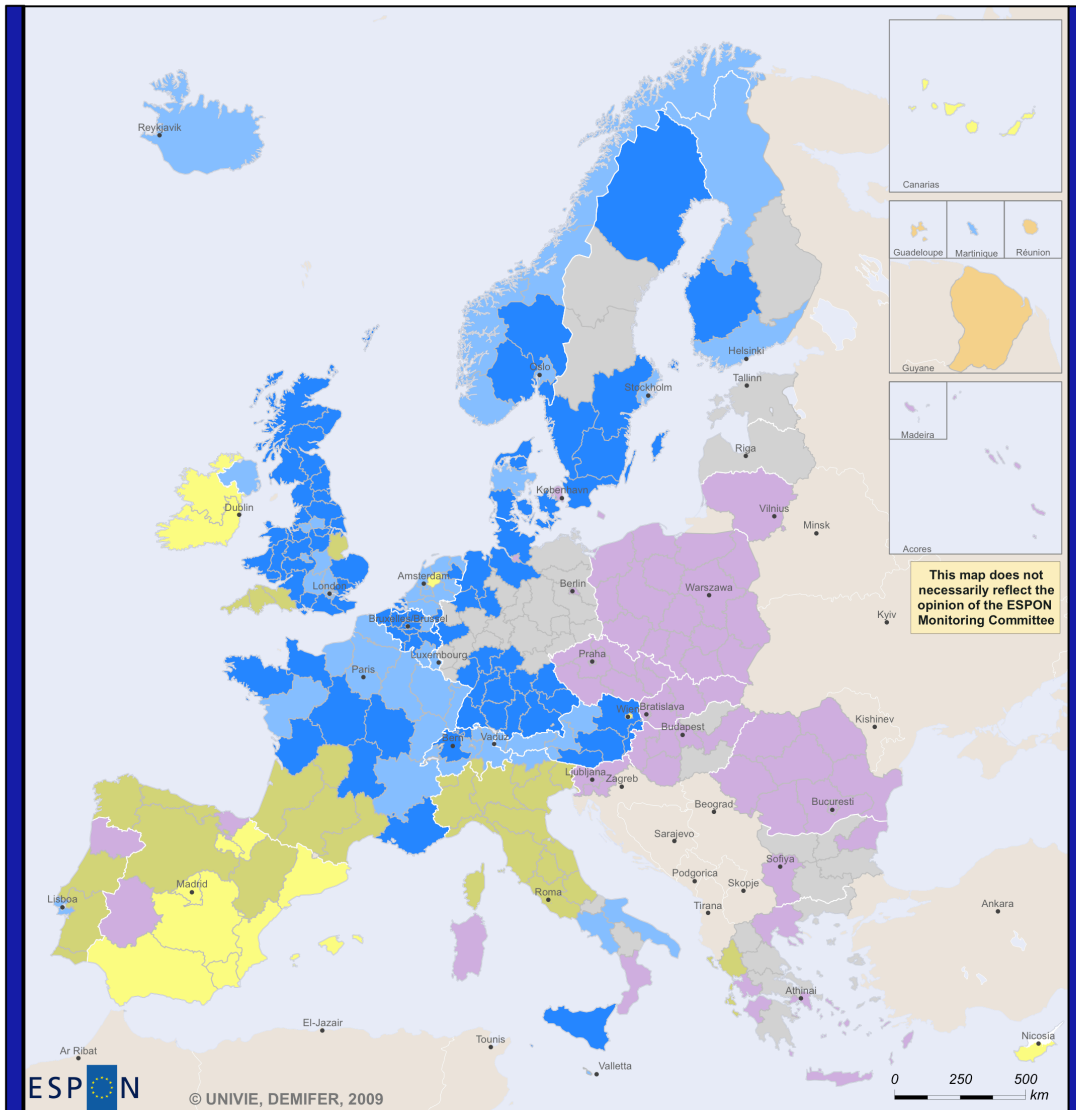
Regional level: NUTS2 (2006); UKI NUTS1 (2006)
Source: Eurostat, NSIs, 2008/09
Origin of data: ESPON 2013 Database, 2009
© EuroGeographics Association for administrative boundaries

Type	Classification	Cases	Population		Age Group 20-39 (%)			Age Group 65+ (%)			Natural Population Increase (per 1000)			Net Migration (per 1000)		
					2005						average per annum 2001-2005					
					avg	min	max	avg	min	max	avg	min	max	avg	min	max
1	Euro Standard	79	127.915.217	25,41%	25,68	22,57	28,72	17,46	15,33	20,30	0,01	-2,67	2,47	3,43	-2,11	9,36
2	Challenge of Labour Force	61	116.767.795	23,20%	30,43	28,33	33,84	14,51	10,60	18,96	-0,78	-4,76	2,89	0,08	-7,35	9,19
3	Family Potentials	55	104.556.600	20,77%	28,15	24,80	36,32	14,57	11,13	16,96	3,72	1,06	9,00	2,12	-3,51	9,59
4	Challenge of Ageing	33	63.838.208	12,68%	26,87	21,52	31,19	20,83	18,51	26,51	-1,74	-6,19	1,43	9,42	4,14	16,99
5	Challenge of Decline	38	50.166.688	9,97%	26,32	21,47	30,04	19,49	15,89	22,55	-3,39	-10,35	-0,59	-1,20	-11,25	3,70
6	Young Potentials	15	38.542.821	7,66%	32,26	29,36	35,86	14,45	8,70	19,03	3,61	-0,15	9,78	17,10	9,96	26,30
7	Overseas	5	1.555.069	0,31%	30,40	27,02	32,55	9,04	3,71	11,81	13,56	8,40	25,28	-1,78	-8,18	9,07
EU 27+4	ESPON Space	286	503.342.399	100%	27,82	21,47	36,32	16,63	3,71	26,51	0,33	-10,35	25,28	3,16	-11,25	26,30

Figure 1: Cluster Profiles

Type 1 – Euro Standard

Type 2 – Challenge of Labour Force

Type 3 – Family Potentials

Type 4 – Challenge of Ageing

Type 5 – Challenge of Decline

Type 6 – Young Potentials

Type 7 – Overseas