DISCUSSION PAPER

Institute of Agricultural Development in Central and Eastern Europe

TYPOLOGY OF RURAL AREAS IN THE CENTRAL AND EASTERN EUROPEAN EU NEW MEMBER STATES

SABINE BAUM, CHRISTIAN TRAPP, PETER WEINGARTEN

DISCUSSION PAPER NO. 72

2004

Theodor-Lieser-Straße 2, 06120 Halle (Saale), Germany
Phone: +49-345-2928 110
Fax: +49-345-2928 199
E-mail: iamo@iamo.de
Internet: http://www.iamo.de

Dipl.-Geogr. Sabine Baum is a research assistant at the Institute of Agricultural Development in Central and Eastern Europe (IAMO), Division: External Environment for Agriculture and Policy Analysis, in Halle, Germany. Her research focuses on rural development in Central and Eastern Europe.

Dipl.-Geogr. Christian Trapp was until spring 2004 student assistant at the Institute of Agricultural Development in Central and Eastern Europe (IAMO), Division: External Environment for Agriculture and Policy Analysis, in Halle, Germany. During this time he finished his diploma thesis "Raumwirtschaftliche Differenzierung ländlicher Räume in Bulgarien".

Dr. Peter Weingarten is the acting Head of Department for External Environment for Agriculture, and Policy Analysis, in Halle, Germany. His research mainly focuses on agricultural and agri-environmental policy analysis as well as on rural development.

Mailing address: Institute of Agricultural Development in Central and Eastern Europe (IAMO)
Theodor-Lieser-Straße 2
06120 Halle (Saale)
Germany

Phone: +49-345-2928 128
Fax: +49-345-2928 199
E-mail: baum@iamo.de
Internet: http://www.iamo.de

Phone: +49-345-2928 130
Fax: +49-345-2928 199
E-mail: weingarten@iamo.de
Internet: http://www.iamo.de

ISSN 1438-2172

ABSTRACT

Rural areas in Central and Eastern Europe are very often associated with a backwardness in terms of income and employment opportunities, a high dependency on agriculture, the out-migration of young, skilled people, a low population density and an insufficient infrastructure. In this paper 3 typologies are presented, which show that rural areas cannot be considered homogeneous and not all of them need the same developmental measures. The first typology classified all NUTS-3 regions in the ten Central and Eastern European countries (CEEC-10) by means of cluster analysis according to 7 demographic and socio-economic criteria. The result revealed 5 different types of regions as most adequate: three are largely rural, one includes both rural, and especially industrialised urban areas, and one covers only large cities. Narrowing the geographical focus to a single country in general improves data availability and allows to include more variables. In our case, Bulgaria, 16 variables on the NUTS-3 level could be condensed by factor analysis to 3 factors, which can be considered as structuring forces in rural Bulgaria: agglomeration, marginality and employment. Based on these factors, 6 groups of rural regions could be identified. The third analysis widened the geographical focus and included beside the NUTS-2 regions of the CEEC-10 also whose of the EU-15 (without UK). The first results of this cluster analysis with 12 variables revealed large developmental differences between these 2 country groups. The 3 typologies presented for different geographical areas provide no code of practice for regional policy measures, but important first clues for the elaboration of adapted rural development measures in CEE.

JEL: C19, P25, R12

Keywords: Rural area, typology, Central and Eastern Europe, cluster analysis

ZUSAMMENFASSUNG

TYPISIERUNG LÄNDLICHER RÄUME IN DEN NEUEN EU-MITGLIEDSTAATEN MITTEL- UND OSTEUROPAS

Ländliche Räume in Mittel- und Osteuropa (MOE) werden häufig assoziiert mit ökonomischer Rückständigkeit, schlechten Beschäftigungsmöglichkeiten, einer hohen Abhängigkeit von der Landwirtschaft, der Abwanderung junger, ausgebildeter Arbeitskräfte, einer geringen Bevölkerungsdichte und einer unzureichenden Infrastruktur. In diesem Beitrag werden drei Typisierungen vorgestellt, die zeigen, dass ländliche Räume nicht als homogen betrachtet werden können und deshalb auch nicht alle dieselben Entwicklungsmaßnahmen benötigen. Die erste Typisierung mithilfe einer Clusteranalyse klassifizierte die NUTS-3-Regionen der 10 mittel- und osteuropäischen Länder (MOEL-10) auf der Basis von sieben demographischen und sozio-ökonomischen Variablen. Sie führte zu fünf Raumtypen: drei davon sind weithin ländlich geprägt, einer umfasst sowohl ländliche und als auch städtisch-industrielle Gebiete und der letzte Raumtyp repräsentiert die großen Städte. In einer zweiten Analyse wurde mit Bulgarien ein einzelnes Land auf NUTS-3-Ebene betrachtet, was in der Regel die Datenverfügbarkeit verbessert und es erlaubt, mehr Variablen in die Analyse mit einzubeziehen. Die berücksichtigten 16 Variablen konnten mithilfe der Faktoranalyse auf drei Faktoren zurückgeführt werden, welche die räumliche Struktur des ländlichen Bulgariens erklären: Agglomeration, Marginalisierung und Beschäftigung. Anhand dieser Faktoren konnten sechs Typen von ländlichen Räumen identifiziert werden. Die dritte Analyse erweitert den geographischen Blickwinkel und umfasst neben den NUTS-2-Regionen der MOEL-10 auch jene der EU-15 (ohne das VK). Hierbei werden große Entwicklungsunterschiede zwischen beiden Ländergruppen deutlich. Die drei Typisierungen bieten in der vorliegenden Form keinen Leitfaden für regionalpolitische Maßnahmen, jedoch wichtige erste Hinweise für die Erarbeitung angepasster ländlicher Entwicklungsprogramme in Mittel- und Osteuropa.

JEL: C19, P25, R12
Schlüsselwörter: Ländlicher Raum, Typisierung, Mittel- und Osteuropa, Clusteranalyse

CONTENTS

Abstract **3**

Zusammenfassung **4**

List of Tables 6
List of Maps 6
List of Abbreviations 6

1 Introduction **7**

2 Typology of NUTS-3 regions in the CEE new Member States **8**
2.1 Methodology and data 8
2.2 Results 9
2.3 Critical assessment 14

3 Narrowing the focus: a typology of rural oblasti in Bulgaria **15**
3.1 Methodology and data 16
3.2 Results 17
3.2.1 Results of the factor analysis 17
3.2.2 Results of the cluster analysis 18

4 Widening the focus: characteristics of CEEC regions compared with EU-15 regions – first results of a cluster analysis for the EU-24 ..... **22**

5 Summary **24**

References **26**

LIST OF TABLES

Table 1: Characteristics of the 5 clusters and of all NUTS-3 regions in the CEECs 11

Table 2: Factor loadings and eigenvalue 17

Table 3: Characteristics of the Bulgarian clusters with regard to the factors "agglomeration", "marginality" and "employment" 18

Table 4: Characteristics of the 6 clusters and of all rural *oblasti* in Bulgaria in 2000 19

Table 5: Characteristics of the 9 clusters of NUTS-2 analysis (CEEC-10 + EU-14)..... 23

LIST OF MAPS

Map 1: Cluster of NUTS-3 regions in the CEE new Member States 10

Map 2: Cluster of rural *oblasti* in Bulgaria..... 21

Map 3: Clusters of NUTS-2 regions in EU-24 (without the UK)..... 24

LIST OF ABBREVIATIONS

CEE	Central and Eastern Europe
CEEC	Central and Eastern European Countries
FDI	Foreign direct investments
GDP	Gross domestic product
MOEL	Mittel- und osteuropäische Länder
NUTS	Nomenclature des Unités Territoriales Statistiques (National Units of Track Statistics of the European Union)
p.c.	per capita
PPP	Purchasing power parities
UK	United Kingdom
VK	Vereinigtes Königreich

1 INTRODUCTION[1]

On May 1st 2004, eight Central and Eastern European Countries – plus Cyprus and Malta – accede to the European Union. Bulgaria and Romania are supposed to follow 2007. The accession and the resulting adoption of the two most important policy domains of the Union – the Common Agricultural Policy, as well as the structural and regional policy – will strongly affect the development of rural areas. In the past, these areas have received only little attention in the Central and Eastern European Countries (CEECs)[2]. In the socialist era, regional or rural policies requiring decentralised decision-making, i.e., local actors and institutions, played only an insignificant role. Since 1990, large cities especially have been the winners of transition, and the urban-rural disparities in the CEECs have increased (e.g., BAUM and WEINGARTEN 2004). Rural areas often suffer from a backwardness in terms of income and employment opportunities, low population density, insufficient infrastructure, a still strong dependency on agriculture, high unemployment and the migration of young, skilled people. In the course of preparing for EU membership and for adopting the EU rural development and structural policies, these rural problems have received increasing political interest in the new Member States.

EU regional and structural policy measures aim to overcome interregional disparities and strengthen backward regions, as laid down in Article 158 of the Treaty Establishing the European Community:

"In order to promote its overall harmonious development, the Community shall develop and pursue its actions leading to the strengthening of its economic and social cohesion. In particular, the Community shall aim at reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions or islands, including rural areas." (Consolidated Version, Official Journal C 325 of 24 December 2002).

Designing adequate regional development programmes requires specific knowledge about the regions to be developed. Thus, questioning whether rural areas[3] are in fact as homogenous as often assumed, this paper analyses socio-economic and demographic differences between the various regions in Central and Eastern Europe. Section 2 presents the methodology and findings of a cross-country cluster analysis carried out for the CEE NUTS-3 regions[4]. In order to obtain more detailed knowledge on regional patterns within one country, in section 3 the focus is narrowed to Bulgaria, whose rural *oblasti* are classified by a factor analysis and a following cluster analysis. Section 4 widens the focus to the enlarged Union. First results of a NUTS-2 cluster analysis for the CEEC-10 + EU-14 (the United Kingdom is not included due

---

[1] This paper was presented at the 87th EAAE-Seminar "Assessing rural development policies of the CAP", organised by Bundesanstalt für Agrarwirtschaft, in collaboration with Bundesanstalt für Berbauernfragen, Institut für Wirtschaft, Politik und Recht of BOKU, Österreichisches Institut für Wirtschaftsforschung, Österreichische Gesellschaft für Agrarökonomie, April 21-23, 2004, Vienna, Austria. Part of this research was conducted in the course of the project "Network of Independent Agricultural Experts in the CEE Candidate Countries" funded by the European Commission (Network 2004). All views expressed and any remaining errors are our responsibility.

[2] In the following, the expression "CEECs" as well as "new Member States" is used for the ten Central and Eastern European Countries Estonia, Latvia, Lithuania, Poland, Czech Republic, Slovakia, Hungary, Slovenia, Romania and Bulgaria, despite their different status with regard to EU accession.

[3] See NETWORK (2004, pp. 3-10) for general problems in defining rural areas.

[4] NUTS = Nomenclature des Unités Territoriales Statistiques (National Units of Track Statistics of the European Union), ranging from NUTS 0 (whole country, in CEECs corresponding to NUTS 1) to NUTS 5. For the CEECs, NUTS-2 divides each of the CEECs into 4 to 16 regions (between 800,000 and 3 Mio. inhabitants per region; for the small countries Estonia, Latvia, Lithuania and Slovenia this level covers the whole country). NUTS 3 comprises 188 regions (between 150,000 and 800,000 inhabitants in each region).

to lacking data) show that nearly all CEEC regions belong to clusters dominated by that region. The paper finishes with a summary in section 5.

2 TYPOLOGY OF NUTS-3 REGIONS IN THE CEE NEW MEMBER STATES

Regional typologies can pursue different objectives. This paper aims to group the CEE regions according to their current stage of development. However, the results obtained cannot directly be used for designing regional policy strategies. This would require additional analyses, taking into account the policy objectives pursued and the causes of differences in development. Nevertheless, the presented typology represents an important preparatory work for the design of EU structural and regional policy in Central and Eastern Europe (cf. THIEL und CRINIUS 1990, p. 80).

2.1 Methodology and data

In order to categorise regions with respect to several characteristics (variables), hierarchical clustering methods were applied using the statistic program SPSS (for more information about cluster analysis see e.g., ECKEY et al. 2002; HAIR et al. 1998). The aim of a cluster analysis is to "partition a set of observations into a distinct number of unknown groups or clusters in such a manner that all observations within a group are similar, while observations in different groups are not similar" (TIMM 2002, p. 515). The degree of similarity in one group is defined by the distance between the observations (here: regions) within a multi-dimensional co-ordinate system where each axis represents one feature (such as GDP per capita). According to its characteristics, each region is definitely positioned in this multi-dimensional space. The closer to each other regions are, the more likely they are to be grouped into the same cluster. The distance between regions can be measured differently. In this paper, the squared Euclidian distance was used, assuming that the variables considered are linearly independent. Indeed, they are – by and large – only slightly correlated.[5] Therefore, there was no reason to carry out a factor analysis prior to the cluster analysis. As an algorithm for clustering, the Ward method was chosen, which usually is well-suited to result in internally homogenous and externally distinguishable groups and regional types, respectively. A hierarchical cluster analysis does not automatically result in one optimal number of clusters. The main approach is that the number of clusters is reduced one by one by merging two existing clusters. In the first step, each region represents a single cluster. After the last step, all regions are included in one cluster. A dendrogram visualises the steps in a hierarchical clustering procedure (HAIR et al. 1998, p. 471). There is no singular measure to decide on the most appropriate number of clusters for the research problem investigated. The elbow criterion, i.e., a sudden jump upwards in the agglomeration coefficients (values of distance measured at several clustering steps), provides an indication of the step at which to stop the clustering procedure. The dendrogram, various statistical values of the clusters, and the plausibility of the grouping are additional means of deciding on the number of clusters. Since the expert is given the responsibility of choosing the distance measure and the clustering algorithm, as well as the most appropriate number of groups, the results of a cluster analysis are always to some degree subjective.

At first glance, when developing a typology of regions it seems desirable to choose that spatial level which is the basis for regional programmes. In the EU, the selection and programme development of objective-1 regions takes place on the NUTS-2 level. Since these spatial units

[5] Correlation coefficients (Pearson) mainly less than +/- 0.4 or even +/-0.1.

are relatively large and heterogeneous, less aggregated units are preferable. Data is taken from a single source, EUROSTAT's NewCronos Regio database, which increases cross-country comparability. However, the least aggregated level for which data is available is NUTS 3. On this level, some regions are still not as internally homogeneous as desired. In addition, not all variables which might be relevant for assessing the stage of development of a region are available. In order to include a reasonable range of variables in the cluster analysis, Slovenia could only be incorporated as a whole country without regional differentiation because of missing variables on its NUTS-3 level. This reduced the number of analysed regions from 188 to 177.

The variables used for the typology have been selected according to their relevance for rural development and their spatial distribution, as well as for questioning whether rural areas can indeed be characterised, as they often are, as having:

- a low population density, which induces few incentives for investment and difficulties in providing sufficient infrastructure;
- an unfavourable age structure of the population due to higher birth rates and the out-migration of young, skilled people;
- still high dependence on agriculture;
- a low GDP per capita;
- lacking non-agricultural income opportunities and high unemployment;
- low educational level.

All of these items – apart from educational level, which was not available on NUTS-3 level – are reflected in the used seven variables:

- population density [inhabitants / km^2], 2000
- crude death rate [number of deaths per 1,000 population in a given year] and crude birth rate [number of births per 1,000 population in a given year] as indicator for the age structure, 2000
- share of value added of agriculture and of industry in total value added [%], 1999 (ROM 1997)
- GDP per capita [Purchasing Power Parities], 2000
- unemployment rate [% of the unemployed in labour force], 2001

All variables were standardised by a Z-transformation[6] to ensure equal weighting in the analysis.

2.2 Results

The cluster analysis of the 177 regions revealed five different clusters as the most plausible result. Ordered according to the respective cluster average of GDP per capita from lowest to highest, these are:

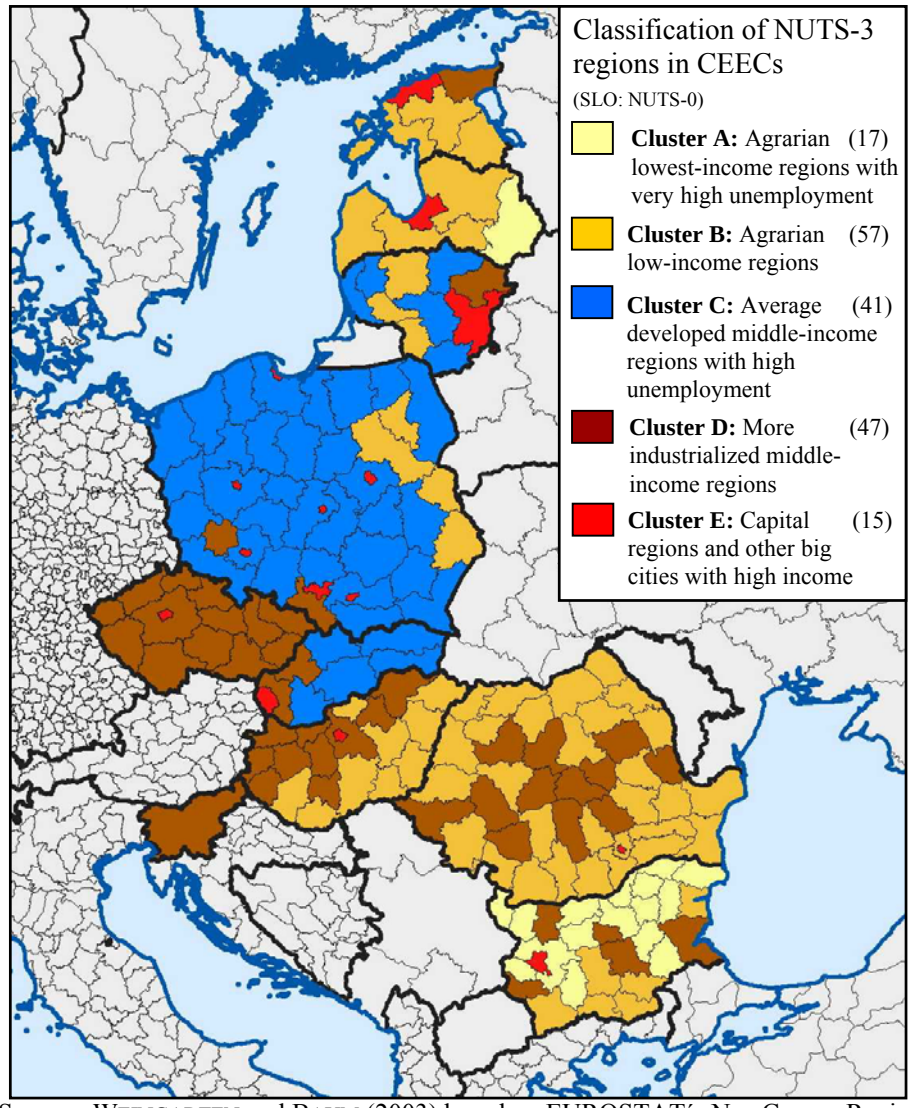
- Cluster A: Agrarian lowest-income regions with a very high unemployment rate;
- Cluster B: Agrarian low-income regions;
- Cluster C: Average developed middle-income regions with a high unemployment rate;
- Cluster D: More industrialized middle-income regions;

[6] By a Z-transformation, a variable is standardised such that its mean equals 0 and its standard deviation equals 1.

- Cluster E: Capital regions and other large cities with high income.

These are visualised in Map 1 and characterised as follows (see also Table 1):

Map 1: Cluster of NUTS-3 regions in the CEE new Member States[7]



Source: WEINGARTEN and BAUM (2003) based on EUROSTAT´s NewCronos Regio data.

Cluster A: Agrarian lowest-income regions with very high unemployment rate
(wide parts of Bulgaria and one region in Eastern Latvia)

These sparsely populated regions (unweighted average: 57 inhabitants / km^2; weighted average of CEEC-10: 97 inhabitants / km^2) are particularly located in the Northern part of Bulgaria, which has the most important farming area in that country. All over Bulgaria, agriculture still plays an important role. In 2000, this sector accounted for 14.5 % of total GDP and 25.7 % of total employment. For many households in rural areas, subsistence farming is a means of survival. In 1999, around one quarter of the total agricultural area was used by small individual farms or household plots which farmed, on average, only one hectare. Within only two years, 1990 to 1992, the employment rate of rural workers declined by 28 %, and in many of the mountain regions by 40 to 50 %. Besides the deteriorating conditions in agriculture,

[7] For a coloured version of this and the following maps see the electronic publication of this Discussion Paper at http://www.iamo.de/dok/dp72.pdf.

de-industrialization has contributed to high unemployment (SIEBERT 2001). Poverty peaked in 1997, with about 41 % of the rural population being poor (WORLDBANK 1999). This cluster contains those regions of Bulgaria – besides Latgale in Eastern Latvia – where very unfavourable factors coincide: The high share of agriculture in total value added (26.0 %; CEEC-10: 6.3%) is connected with the lowest GDP per capita (PPP 4,739; CEEC-10: PPP 8,694) and the highest unemployment (29.0 %; CEEC-10: 13.1 %) among all groups. Sufficient job alternatives are widely lacking. The share of industry in value added averages only 21.3 % (CEEC-10: 34.6 %). A tendency of out-migration likely explains the high share of people aged over 60 (23.1 %; CEEC-10: 18.1 % – crude death rate 16.0; CEEC-10: 11.0).

Table 1: Characteristics of the 5 clusters and of all NUTS-3 regions in the CEECs

		Included in the cluster analysis							Additional information [5]	
Cluster (number of regions with characteristics)		Population density [inh./km²]	Crude birth rate	Crude death rate	GDP per capita [PPP]	Unemployment rate [%]	Share of value added of industry [%]	Share of value added of agriculture [%]	Share of value added of services [%]	Share of population aged 60 and over [%]
		2000	2000	2000	2000	2001	1999 [1]	1999 [1]	1999 [1]	2000 [2]
Cluster A (17)	Average [3]	57.2	8.8	16.0	4739	29.0	21.3	25.8	52.9	23.1
	Minimum	26.4	6.9	13.0	2674	16.0	8.7	6.1	40.2	19.0
	Maximum	98.9	11.6	21.0	5823	43.0	33.5	47.6	74.0	29.8
	Variat. coeff.	0.29	0.13	0.13	0.16	0.21	0.35	0.40	0.16	0.15
Cluster B (57)	Average [3]	71.9	10.4	12.0	5390	10.0	31.0	22.4	46.5	19.5
	Minimum	14.9	7.7	9.0	3428	3.0	19.5	1.1	26.3	14.5
	Maximum	173.2	14.8	16.0	9890	28.0	40.0	49.1	65.7	26.4
	Variat. coeff.	0.45	0.13	0.17	0.27	0.60	0.17	0.44	0.24	0.12
Cluster C (41)	Average [3]	96.7	10.3	9.0	7378	21.0	35.0	7.1	57.9	16.4
	Minimum	37.2	8.6	8.0	5530	13.0	26.1	3.5	46.0	13.7
	Maximum	190.0	13.2	12.0	10320	31.0	44.3	13.3	66.6	20.3
	Variat. coeff.	0.37	0.11	0.11	0.15	0.19	0.13	0.38	0.10	0.10
Cluster D (47)	Average [3]	107.0	9.4	12.0	8.895	10.0	45.9	9.2	44.9	18.7
	Minimum	27.7	7.2	8.0	4.837	3.0	35.7	0.8	29.0	15.4
	Maximum	324.1	11.9	17.0	15255	28.0	56.7	21.5	61.3	25.2
	Variat. coeff.	0.47	0.11	0.17	0.30	0.60	0.10	0.60	0.16	0.13
Cluster E (15)	Average [3]	2162.9	8.0	11.0	15757	9.0	27.5	0.8	71.8	18.1
	Minimum	91.9	6.8	9.0	8081	2.0	17.0	0.0	60.2	14.9
	Maximum	8780.0	9.3	14.0	27141	21.0	39.8	3.3	82.9	21.6
	Variat. coeff.	0.99	0.09	0.18	0.38	0.56	0.24	1.25	0.09	0.12
All regions (177)	Average [3]	262.8	9.8	12.0	7597	14.0	34.7	13.8	51.5	18.8
	Minimum	14.9	6.8	8.0	2674	2.0	8.7	0.0	26.3	13.7
	Maximum	8780.0	14.8	21.0	27141	43.0	56.7	49.1	82.9	29.8
	Variat. coeff.	3.19	0.14	0.17	0.50	0.64	0.27	0.79	0.23	0.15
CEEC-10 [4]		97.0	9.7	11.0	8694	13.1	34.6	6.3	59.1	18.1
EU-15 [4]		118.7	10.7	9.9	22603	7.6	27.7	2.1	70.3	21.8 [6]

Notes: [1] H 1998, ROM 1997. [2] H, LV 1999, EST 2001. For Poland, no data were available on NUTS-3 level, so that the values of the NUTS-2 regions had to be used for the respective NUTS-3 regions. [3] Unweighted arithmetic mean value. [4] Weighted arithmetic mean value. [5] Not included in the analysis. The share of value added of services is indirectly considered since it adds up to 100 % with the shares of value added

of agriculture and industry. Data on the share of population aged 60 and over are missing for some regions.
[6)] Projection of 1995 (EUROSTAT).
Sources: Authors' computations based on EUROSTAT's Newcronos Regio data; KOM (2002).

Cluster B: Agrarian low-income regions
(wide parts of Romania, Southeastern Hungary, parts of Bulgaria, Estonia, Latvia, Poland)

This cluster contains regions which are characterized by a comparatively high importance of agriculture (share of total value added is 22.4 %) and low income per capita (PPP 5,390). In contrast to cluster A, this group has, on average, both a higher GDP p.c. and share of industry in value added, as well as a lower unemployment rate (10.0 %) and crude death rate (12.0). The unemployment rate shows, however, a high dispersion within this cluster (between 3 % in Bihor and Satu Mare in Northwestern Romania, and 28 % in Smolyan/Southern Bulgaria). Although being altogether an agrarian cluster, the structure of the agricultural sector is rather heterogeneous. This can be demonstrated by comparing Romania and Hungary, which have the largest share of regions in this cluster. In all of Romania, in which nearly half of the regions of this group are located, about 44 % of the total employed labour force worked in agriculture in 2001. High urban unemployment, the good prospects of acquiring land which offers the opportunity to produce food for own needs, and low costs of living in rural areas led to reverse migration from urban to rural areas, and an increasing share of agricultural employment during the 1990's. Romanian agriculture is characterised by a high fragmentation of land and low-input-low-output systems. In contrast, in all of Hungary, (nine regions of the cluster) the share of agricultural employment decreased from about 20 % at the beginning of transition to only 5.3 % in 2001 (10 % in Southern regions, respectively). Hungary's agriculture is, compared to Romania, much more productive and efficient, the institutions necessary for a functioning market economy are much more developed, and in addition to family farms, large cooperatives and companies play an important role (cf. SAILER 2001b; SIEBERT 2001).

Cluster C: Average developed middle-income regions with a high unemployment rate
(most of the Polish regions, Eastern Slovakia, parts of Lithuania)

A struggle with high unemployment (21.0 % on average) is the most striking unifying feature of the regions which form this cluster. Despite the achieved growth in GDP p.c. since 1993, (after the drastic decline at the beginning of transition) which resulted in an average income of PPP 7,378, economic recovery has generally not led to comparable growth in (formal) employment (cf. KEUNE 2000). The high number of dismissed agricultural and industrial employees, the result of the necessary structural changes and privatisation during the transformation process could not be absorbed by a sufficient number of new jobs, which caused far-reaching social problems. The rather young population – indicated by the low share of population aged 60 and over (16.4 %) – aggravates the problem. The share of gross value added in the three respective sectors corresponds strongly with the weighted average shares in all CEECs. The most prosperous sector is services, which shows, in this cluster, the second highest value after cluster E, the capital regions. In 17 of the 41 regions of cluster C, services contributed more than 60% to the total value added. Among these regions are more touristic areas like those in Northern Slovakia and the Baltic coastal regions in Poland, as well as regions with large cities like Kauno and Klaipedos in Lithuania. In Kauno, the share of services in gross value added increased by 9 percentage points between 1995 and 1999, in Slovakia and many Polish regions by 6 percentage points. The industrial sector showed the most striking loss, falling more than 7 percentage points in Slovakia and more than 6 percentage points in Kauno.

Cluster D: More industrialized middle-income regions

(Czech Republic, Slovenia, Northwestern Hungary, parts of Romania, Bulgaria, Poland, Slovakia, Northeastern Lithuania, Northeastern Estonia)

The main feature of this cluster is the high percentage share of industry in value added (45.9 %; CEEC-10: 34.6 %), whereas the shares of agriculture (9.2 %) and services (44.9 %; CEEC-10: 59.1 %) are rather low. Included are regions with long industrial traditions (such as in the Czech Republic), as well as regions which were particularly industrialised during the socialist era (as in Bulgaria). Many of these industrial areas are mono-structured, in a difficult process of diversification and modernisation due to the persistence of old technologies, and have environmental problems. Generally, the privatisation and restructuring processes have been a difficult task for all transition countries. Many of the large industrial plants which were erected at single focal points had to close down or to reduce their production and dismiss many employees. Those laid-off often have specific skills which cannot be easily used in other jobs. Thus, unemployment rates are locally high. Examples of such regions are Northern Bohemia in the Czech Republic with mining, metallurgy, energy and the chemical industries, (unemployment rate 15 %) or Upper Silesia in Southern Poland with mining, coal, iron and the steel industries, (unemployment rate 25 %) (cf. FÖRSTER 1999a, b). Industrially-characterised regions in Bulgaria, Slovakia, Estonia and Latvia also have unemployment rates above the cluster average of 10.0 %. Low unemployment rates below 10% are likely caused by the size of regions, which not only cover the locally-concentrated industrial sites, but also large agricultural areas, as in Hungary. Moreover, in Romania, unemployment rates are generally low because of the low incentives to register as unemployed, the importance of small family farms for employment, and measures like shortened work schedules. Some regions – such as Gliwice in the Western part of Upper Silesia – have been in some ways successful in industrial restructuring. Business start-ups, foreign direct investments (FDI, e.g., in the automobile industry) and the expansion of motorways and educational institutions have contributed to a more positive development (DOMANSKI 1998). In general, the "more industrialised middle-income regions" have better infrastructure and educational levels, higher population density, and a higher GDP p.c. (PPP 8,895, which is slightly above the CEEC-10 average) than agrarian regions. Despite existing problems, this is a decisive advantage in overcoming structural change and stimulating new economic activities.

Cluster E: Capital regions and other large cities with high income

This cluster includes those regions which have benefited most from the transition process – capitals and other large cities with, on average, an increasing high income (PPP 15,757), a high share of services in total value added (71.8 %), a rather low unemployment rate (9.0 %), well-developed infrastructure and high population density (2,163 inhabitants / km^2). Bucharest has a somewhat special role, being in four of the seven variables among the extreme values within this cluster (lowest GDP p.c., highest population density, highest share of industry and lowest share of agriculture in gross value added within this cluster). Thus, in the case of six clusters instead of five, the Romanian capital is not included in the "capital regions"-cluster, but forms a single cluster. In general, the capital regions have been rather successful in attracting FDI (cf. section 4.5). For example, in Slovakia, in 1995, 60 % of the total FDI was invested in Bratislava (SMITH and FERENCIKOVA 1998). In Poland, FDI concentrated on Warsaw and other large cities and western parts of the country (cf. PÜTZ 1998). In Hungary, the strong concentration of FDI in Budapest, (about two thirds of foreign capital in the mid-1990s) and other Northwest regions has fallen since 1995 (cf. SAILER 2001a). Since the beginning of transition, the disparities between the booming capitals and the rest of the countries have increased in most countries, and have been particularly pronounced in Latvia and

Poland. This corresponds to the priority of macroeconomic growth over regional balance in the CEECs. The ratio of the poorest region (in all cases rural areas) of the respective country to the richest region (in all cases the capital) based on GDP per capita (PPP) increased in six countries between 1995 and 2000. This measure revealed the highest disparities in Poland (1 : 5.4 in 2000), Latvia (1 : 4.3), Hungary (1 : 3.5) and Slovakia (1 : 3.1), whereas Slovenia had a rather homogeneous structure (1 : 1.7). These rising disparities are not caused by an absolute decline in GDP per capita of the poorer regions (except for Latvia). Rather, they could not keep pace with the quick growth in the capital regions (cf. WEINGARTEN and BAUM 2003). Although the capitals and large cities are the most prosperous regions, they are also confronted with problems. In Budapest, for example, there exist difficulties with derelict buildings in the downtown area, and increasing social polarisation within the city (WIEßNER 1999). Suburbanisation has begun to take place, from which the regions surrounding large cities benefit (cf. BROWN and SCHAFFT 2002 for Hungary).

To summarise the results, the cluster analysis of the CEE new Member States on the NUTS-3 level revealed five different types of regions as the most adequate result: three are largely rural (cluster A, B and C), one includes both rural and especially industrialised urban areas (cluster D) and one covers only large cities (cluster E).

2.3 Critical assessment

In principle, the cluster analysis method can be considered as suitable for classifying regions. As an explorative instrument for analysis it has the advantage – in contrast e.g., to the formation of indices – of being able to reveal so far unknown structures and coherences and thus to contribute to new insights. Its disadvantage results from its partial subjectivity. A cluster analysis never follows a standard procedure, but the researcher has relatively high "freedom" and responsibility to decide on variables, the distance measure and the algorithm for clustering. In addition, there is no single convincing criterion to decide on the optimal number of clusters, but several weak criteria such as the elbow criterion or the plausibility of the result. Thus, the resulting typology is always the specific outcome of the used algorithms and variables, as well as the assessment of the optimal cluster number. Other indicators or procedures could lead to other classifications. In order to improve the results of hierarchical clustering a K-means-analysis can be carried out afterwards, taking the results of the hierarchical clustering as the starting point. However, in our case this additional analysis did not result in an increased homogeneity of the clusters. The 3 out of 35 cases, in which the variation coefficient of a variable in a cluster is higher than the variation coefficient of that variable in the whole sample, could not be eliminated. In twelve cases the standard deviation increased within the clusters, whereas it decreased in thirteen cases. Only 20 out of 177 regions are regrouped to neighbouring clusters by the k-means-analysis, whereby this does not seem to increase the plausibility of the typology.[8] Therefore, the results of the original hierarchical cluster analysis was chosen for interpretation.

The restricted data availability on a more disaggregated level constrained the analysis. Additional variables for further differentiation, especially of rural areas – such as farm structure and efficiency, natural conditions and employment – would have been desirable. The typol-

[8] This can be demonstrated with the example of Sofia. The Bulgarian capital was regrouped from Cluster E to cluster D, although it has an extremely low share of industry, a high population density and a high income, and, thus, increases the heterogeneity of cluster D.

ogy would be further enhanced if data on the NUTS-4 or even NUTS-5 regions could be used, where the single units are more homogeneous.

The typology revealed large differences between the several countries, which influenced the cluster result. The country averages in CEE vary, for instance, in unemployment, between 6 % in Slovenia and Hungary and 20 % in Bulgaria. Divergent definitions or approaches of collecting statistical data can also play a role and affect the outcome. In Romania, for example, the low unemployment rates are mainly explainable by the low incentives to register as unemployed (cf. remarks for cluster D). Partially, the high dispersion of variables within the whole sample also caused a relatively high dispersion of specific variables within the clusters.

With the existing typology a categorisation of regions according to demographic and socio-economic criteria was achieved. It shows that, besides regional disparities in the CEE new Member States, there are large economic differences between urban areas (cluster E) on the one hand and rural areas (cluster A-C) on the other hand. In addition, the results confirm that rural areas cannot be considered homogeneous and that general statements like "over-aged rural population" are not appropriate. The typology provides in its existing form no code of practice for regional policy measures, but first clues for the elaboration of rural development measures in CEE within the scope of EU structural and regional policy. In this connection, it is useful that the analysis compares *all* CEE regions and gives an overview of their socio-economic situation. "The clarification of the current situation and present development are already important instruments of regional policy. The very presentation of regional types, which are characterised by varying developments and standards, can initiate political effects and support or stimulate argumentations of regional policy" (own translation of THIEL and CRINIUS 1990, p. 79). The conducted analysis shows the spatial arrangement of agrarian regions in Central and Eastern Europe (cluster A and B), in which the necessary structural change should be particularly supported. The different occurrences of the age structure in the several clusters reveal that development measures – for example in education – should not be uniform but should rather be adapted to the respective age groups. On the other hand, cluster C demonstrates that the high unemployment in these regions seems to be rather a macroeconomic than a regional problem.

In order to design concrete policy recommendations for the regional planning programmes of the countries adapted to the peculiarities of the specific regions, more detailed cluster analyses – on a more disaggregated regional level including additional variables – are necessary. It would be useful to thereby concentrate on single countries with their specific problems (cf. for example, ROVAN and SAMBT 2003 for Slovenia). That would also reduce the differences in development within the whole sample, as well as the statistical difficulties of comparability. Possibly, problems of data availability on a highly disaggregated level could also be solved more easily by concentrating on one single country. In the next section, the results of such an analysis for Bulgaria are discussed, where it was possible to include a higher number of variables on the NUTS-3 level[9] (see TRAPP 2003 for more details).

3 NARROWING THE FOCUS: A TYPOLOGY OF RURAL OBLASTI IN BULGARIA

As in other CEECs, regional policy has become more important in Bulgaria during recent years. In order to strengthen regional capacities for policy making, in 1999 the number of *oblasti* (NUTS 3) was increased from 9 to 28 and the Regional Development Act came into force, which aims to reduce interregional disparities. Also in 1999, the Bulgarian parliament

[9] Due to a lack of data it was not possible to carry out the analysis on the NUTS-4 or even NUTS-5 level.

adopted the National Plan for Regional Development. Based on regional economic development, demographic indicators, infrastructure indicators, etc., as well as the geographical location, the NUTS-5 regions are grouped into four classes: areas for growth, areas for development, areas for trans-border co-operation and development, and areas with specific problems (ILIEVA et al. 2002, pp. 32). Whereas the areas in the former two classes have predominantly urban characteristics, the latter comprises less developed rural areas and areas in industrial decline. Some regions belong to more than one class, while some regions belong to no class at all. The methodology of this classification is rather unclear and, thus, the transparency insufficient. Furthermore, the Bulgarian regional policy and, programmes are still in discussion.

In order to support this discussion, *all* predominantly rural *oblasti* are analysed in the following to identify regional patterns as well as driving forces behind the diverging processes in rural Bulgaria. According to the OECD definition, those NUTS-3 regions are predominantly rural where more than 50 % of the total population are living in communities (NUTS-5) with a population density below 150 inhabitants per square kilometre. Applying this definition, Sofia is the only NUTS-3 region out of 28 which is not rural but predominantly urban and, thus, excluded from the analysis.

3.1 Methodology and data

As in the case of the CEECs, a cluster analysis is used to identify regional patterns. Focussing on a single country allows the inclusion of more variables in the analysis due to the better availability of data. Data are based on official statistics from the National Statistical Institute of Bulgaria (NSI 1999, 2000) and EUROSTAT´s Newcronos Regio data base as well as on the United Nations Development Programme (UNO 2002). The following 16 variables which are important for the development of rural areas could be included in the analysis for the year 2000:

- economic variables: gross value added of industry per capita [LEV], gross value added of services per capita [LEV], GDP per capita in PPP [% of EU-15 average], share of (contracted) employment in agriculture[10] in total employment [%], FDI per capita [USD], unemployment rate [%], long term unemployment rate [%], firm density [number of firms per 1,000 inhabitants];
- socio-demographic variables: share of young people (aged less than 19) in total population [%], share of ethnic minorities (Turks, Roma) in total population [%], share of highly-educated people in total population aged 25-59 [%], share of lowly-educated people in total population aged 25-59 [%]
- settlement and infrastructure variables: population density (inhabitants/km^2), share of population living in rural communities [%], telephone density (lines per 1,000 inhabitants), physician density [doctors per 10,000 inhabitants].

Since the variables are correlated with each other, it is necessary and useful to carry out a factor analysis prior to the cluster analysis. The factor analysis concentrates the information of many single variables to groups of variables forming latent dimensions (factors) which are not directly observable, but can explain the variance of the single variables. Thereby, important factors behind the spatial structure and economic differences of the regions can be revealed.

[10] It has to be noted that agricultural employment here does not included self-employed persons. Data on self-employed persons was not available at the NUTS-3 level.

In this study, a principle component analysis with VARIMAX factor rotation and Kaiser standardisation was applied. The variables were standardised by Z-transformation. Second, based on these factors different types of regions are identified by a cluster analysis of the same type as described in section 2.

3.2 Results

3.2.1 Results of the factor analysis

Using the factor analysis, three factors could be extracted which together explain 71.5 % of the total variance of all 16 variables included in the data set. The correlations of each standardised variable and the factors are presented in Table 2. The measure of sampling adequacy (Kaiser-Meyer-Olkin criterion) reaches 0.72 which is a middling value. The firm density is not considered in the following description since it has only low factor loadings for each of the three factors.

Table 2: Factor loadings and eigenvalue

Variable	Factor 1: "Agglomeration"	Factor 2: "Marginality"	Factor 3: "Employment"	Communality
Gross value added of services	**0.892**	-0.046	-0.181	0.830
Gross value added of industry	**0.782**	-0.019	-0.241	0.670
Share of highly-educated	**0.779**	-0.472	-0.156	0.854
Telephone density	**0.736**	-0.546	-0.065	0.843
FDI	**0.710**	-0.151	-0.229	0.579
Population density	**0.707**	-0.099	-0.066	0.513
GDP per capita	**0.692**	-0.230	-0.177	0.563
Share of young people	0.020	**0.874**	0.144	0.785
Share of ethnic minorities	-0.062	**0.833**	0.201	0.738
Physician density	0.353	**-0.743**	-0.164	0.703
Rural population	-0.508	**0.697**	0.193	0.781
Share of lowly-educated	-0.345	**0.664**	0.404	0.723
Unemployment rate	-0.292	0.159	**0.874**	0.875
Long-term unenmployment	-0.383	0.151	**0.789**	0.792
Contracted employment in ag.	0.005	0.307	**0.770**	0.688
Firm density	0.488	-0.270	-0.436	0.501
Eigenvalue [1)]	5.01	3.76	2.67	total: 11.44
Percentage of trace (trace = 16) [2)]	31.33	23.50	16.66	total: 71.5

Notes: [1)] The eigenvalue is the sum of the squared factor loadings over all variables.
[2)] The percentage of trace is the percentage of the variance in all variables explained by the factor.
Source: TRAPP (2003), modified.

The first factor explains 31.3 % of the total variance of the variables. All of the 7 high-loading variables (factor loading > 0.6) of this factor have a positive sign. These are the gross value added p.c. of services and industry, highly-educated people, the telephone density, FDI p.c., population density and GDP p.c. Since high values of these variables are associated with agglomeration advantages, this factor is thus named "agglomeration". *Oblasti* with an extremely high factor value are Varna, Burgas and Plovdiv, whereas the values are particularly low in Vidin, Kardzhali and Pernik.

In contrast, factor 2 ("marginality"), explaining 23.5 of the total variance, is characterised by 5 high loading variables which are often typical for socially-marginalised areas in Bulgaria: a high share of young people, indicating a high fertility rate, a high share of marginalised ethnic minorities (Roma, Turks), a low physician density, a high share of people living in rural areas and a low educational level. According to the values of this factor, Kardzhali, Razgrad and

Silistra are particularly marginalised regions. In contrast, low values indicating no marginalisation are typical for Gabrovo, Vidin und Pernik.

The last extracted factor has 3 high-loading variables which are the unemployment rate, the share of long-term unemployment and the share of employment in agriculture. This factor, explaining 16.7 % of the total variance, is named "employment". Values are highest in Targovishte, Yambol and Razgrad and lowest in Kardzhali, Gabrovo and Blagoevgrad.

The isolated factors "agglomeration", "marginality" and "employment" can be considered as structuring forces in rural Bulgaria. They stress the importance of agglomeration advantages, the importance of minorities in Bulgaria as well as employment patterns.

3.2.2 Results of the cluster analysis

The three factors identified by the factors analysis were used as variables in the cluster analysis. With this multivariate analysis method, the following six types of rural regions could be identified

- Cluster 1: Agrarian border regions with very high unemployment;
- Cluster 2: Agrarian and marginal regions with high unemployment;
- Cluster 3: Marginal border regions with relatively low unemployment;
- Cluster 4: Middle-income regions with lowest unemployment;
- Cluster 5: More industrialised agrarian regions with relatively high income;
- Cluster 6: Growth regions with highest income.

The characteristics of these clusters are described in Table 3 with regard to the three factors and in Table 4 by those non-standardised variables which are high-loading (all except for the firm density). Map 2 (p. 21) visualises the six clusters.

Table 3: Characteristics of the Bulgarian clusters with regard to the factors "agglomeration", "marginality" and "employment" [1)]

	Factor 1: **"Agglomeration"**	Factor 2: **"Marginality“**	Factor 3: **"Employment"**
Cluster 1: Agrarian border regions with very high unemployment	relatively low (-0.94)	relatively low (-0.92)	extremely high (1.10)
Cluster 2: Agrarian and marginal regions with high unemployment	around the average (-0.17)	relatively high (0.85)	relatively high (0.84)
Cluster 3: Marginal border regions with relatively low unemployment	slightly below average (-0.61)	relatively high (0.74)	extremely low (-1.15)
Cluster 4: Middle-income regions with lowest unemployment	slightly above average (0.60)	extremely low (-1.33)	extremely low (-1.33)
Cluster 5: More industrialised agrarian regions with relatively high income	slightly above average (0.36)	slightly below average (-0.55)	slightly above average (0.31)
Cluster 6: Growth regions with highest income	extremely high (2.23)	around the average (0.14)	slightly below average (-0.43)

Note: [1)] The characteristic values are defined as follows: < +/- 0,3 = around the average, +/- 0,3 to 0,7 = slightly above/below average, +/- 0,7 bis 1,0 = relatively high/low, > +/- 1,0 = extremely high/low.

Source: TRAPP (2003).

Table 4: Characteristics of the 6 clusters and of all rural *oblasti* in Bulgaria in 2000

		GDP p.c. (PPP) in % of EU-average	Population density in inh./km²	Highly educated per 1,000 inh.	GVA of industrial sector per inh. in LEV	GVA of tertiary sector per inh. in LEV	FDI per inh. in US$	No. of telephone mainlines per 1,000 inh.	Share of population in rural communities in % (<150 inh./km²)	Share of minorities in total population in % (Turks, Roma)	Share of total population aged 0-19 in %	Density of physicians per 10,000 inh.	Low educated per 1,000 inh.	Share of agriculture in employment in %	Unemployment rate in %	Long-term unemployment rate in %
C1 (3)	Average[1)]	17.9	48.8	53.8	279.0	1217.5	24.5	347.3	38.8	8.6	15.9	35.7	461.8	7.9	22.8	50.9
	Minimum	17.6	44.9	49.1	205.6	1099.7	-0.3	328.1	34.0	7.7	15.0	32.2	444.6	5.3	19.4	48.6
	Maximum	18.2	51.8	59.7	318.5	1380.2	55.8	358.5	41.9	10.4	16.8	41.8	484.8	12.2	24.6	52.6
	Variation coeff.	0.02	0.07	0.10	0.23	0.12	1.17	0.05	0.11	0.17	0.06	0.15	0.04	0.47	0.13	0.04
C2 (7)	Average[1)]	19.1	59.6	52.2	402.1	1122.6	90.0	336.4	44.7	31.1	18.7	30.2	498.5	10.0	21.8	46.4
	Minimum	17.5	47.6	43.2	280.0	993.9	15.8	299.3	33.3	13.4	17.8	24.1	466.0	6.9	18.0	38.3
	Maximum	23.8	70.4	69.4	509.8	1388.9	364.1	430.7	56.4	47.3	20.1	39.9	524.7	11.4	29.7	51.4
	Variation coeff.	0.11	0.13	0.17	0.22	0.12	1.36	0.13	0.21	0.39	0.04	0.17	0.04	0.20	0.20	0.09
C3 (5)	Average[1)]	20.0	50.0	48.9	687.8	1159.7	124.7	328.9	46.2	18.5	18.1	32.2	479.9	3.8	14.8	38.8
	Minimum	16.0	36.3	31.3	382.4	943.6	3.3	209.5	31.4	4.5	16.5	21.3	462.0	2.9	12.4	34.5
	Maximum	26.0	62.7	63.3	1213.6	1342.3	528.8	415.0	66.9	51.8	19.7	41.9	494.3	5.3	22.0	42.5
	Variation coeff.	0.19	0.20	0.26	0.48	0.14	1.82	0.24	0.28	1.04	0.08	0.23	0.02	0.24	0.28	0.09
C4 (3)	Average[1)]	23.0	64.7	72.8	879.1	1312.8	254.1	395.8	27.2	4.9	14.8	42.9	404.2	2.4	12.0	34.4
	Minimum	19.8	55.4	56.4	546.9	1258.5	28.7	347.9	22.3	2.1	14.3	39.7	367.1	2.0	10.2	29.9
	Maximum	25.3	75.3	88.4	1155.5	1372.1	691.1	458.8	34.7	8.0	15.5	47.5	425.4	2.7	13.9	36.9
	Variation coeff.	0.13	0.15	0.22	0.35	0.04	1.49	0.14	0.24	0.61	0.04	0.10	0.08	0.17	0.16	0.11
C5 (6)	Average[1)]	24.9	69.2	73.6	1065.1	1317.3	117.4	413.6	36.2	10.5	16.4	37.4	426.5	6.7	17.8	44.0
	Minimum	21.4	42.3	55.2	593.7	1197.2	56.7	364.5	30.3	5.9	15.2	30.3	411.7	5.7	13.7	37.0
	Maximum	32.0	97.5	84.8	1936.1	1409.0	208.9	451.0	42.1	18.3	17.3	48.7	438.0	8.8	22.1	51.1
	Variation coeff.	0.18	0.26	0.15	0.51	0.06	0.51	0.07	0.12	0.41	0.05	0.19	0.03	0.19	0.15	0.10
C6 (3)	Average[1)]	27.9	96.9	95.1	1095.4	1717.4	207.4	484.9	26.2	14.1	17.2	41.0	429.6	4.9	13.2	35.5
	Minimum	21.4	54.9	74.7	704.4	1321.0	111.9	435.6	20.6	11.3	16.3	31.0	415.2	3.5	11.9	32.7
	Maximum	32.9	121.9	123.3	1617.4	2098.6	390.0	567.9	30.1	19.4	18.2	481	456.0	7.6	14.1	40.0
	Variation coeff.	0.21	0.38	0.26	0.43	0.23	0.76	0.15	0.19	0.33	0.06	0.22	0.05	0.47	0.09	0.11
All (27)	Average[1)]	21.8	63.5	63.6	718.7	1270.5	126.5	376.5	38.4	16.9	17.2	35.4	456.8	6.5	17.7	42.4
	Minimum	16.0	36.3	31.3	205.6	943.6	-0.3	209.5	20.6	2.1	14.3	21.3	367.1	2.0	10.2	29.9
	Maximum	32.9	121.9	123.3	1936.1	2098.6	691.1	567.9	66.9	51.8	20.1	48.7	524.7	12.1	29.7	52.6
	Variation coeff.	0.21	0.32	0.30	0.62	0.18	1.35	0.19	0.28	0.81	0.09	0.21	0.08	0.48	0.28	0.15

Notes: [1)] Unweighted arithmetic mean value.
Source: TRAPP (2003) based on EUROSTAT 2000, NSI 1999 and 2000, UNDP 2002.

Cluster 1: Agrarian border regions with a very low income and high unemployment
(bordering Romania, Serbia and Turkey)

The regions of cluster 1 (Vidin, Montana and Yambol) are sparsely populated (48.8 inhabitants / km^2) and economically extremely disadvantaged, showing the lowest GDP p.c. reaching only 17.9 % of the EU-15 average, the lowest FDI per capita (25 US$) and the highest unemployment (22.8 %) as well as long-term unemployment rate (50.9 %). Furthermore, the gross value added of industry reaches only 279 LEV (143 EUR) per capita in comparison with 719 LEV (368 EUR) as the unweighted average for all 27 *oblasti*. The average educational level is rather low. Altogether, cluster 1 has the lowest value of the factor "agglomeration" (-0.94), but also a relatively low value of the factor "marginality". All high-loading variables of the latter factor are close to the average except for the share of minorities. Turks and Roma only account for 8.6 % of the total population. The high value of the "employment" factors indicates the high share of contracted agricultural labor as well as the unfavorable unemployment figures.

Cluster 2: Agrarian and marginal regions with high unemployment
(Northeast Bulgaria)

Cluster 2 comprises Silistra, Dobrich, Razgrad, Shumen, Targovishte, Sliven and Pazardzhik. This cluster is strongly mariginalised (factor value 0.85) due to the highest share of minorities (31 %) and the proportion of persons living in rural areas (45 % of total population), whereas

the agglomerative character of this cluster is medium with a factor value of -0.17. The share of lowly-educated persons is highest in this cluster as well as the share of those aged 0 to 19. The share of highly-educated persons is with 52 per 1,000 inhabitants very low. With only 30 physicians per 10,000 inhabitants medical infrastructure is the worst of all clusters. The rather bad economic situation is also mirrored by a high unemployment rate of 22 %, which is part of the factor "employment". Its relatively high value is furthermore reflected in the high importance of agriculture.

Cluster 3: Marginal border regions with relatively low unemployment
(South of Bulgaria)

The five regions Haskovo, Kardzhali, Smolyan, Blagoevgrad and Sofia, which border on Greece, Turkey, Macedonia or Serbia, respectively, form cluster 3. The peripheral character of this cluster goes in line with the value of the factor "agglomeration" of –0.61 which is below average. The gross value added of industry as well as FDI per capita, approximate the average. In contrast, the population density (50 inhabitants / km^2) is rather low, leading to a high share of people living in rural areas (46 %) and poor access to medical services as measured by physician density. The relatively high value of the factor "marginality" (0.74) is also caused by the second-highest share of minorities (18 %). Due to the unfavourable mountainous natural conditions, agriculture has not played a dominant role in this region. The unemployment rate (15 %) is below the national average.

Cluster 4: Middle-income regions with lowest unemployment
(Middle-west and central Bulgaria)

Cluster 4 comprises Gabrovo, Pernik and Kyustendil. The latter two, close to Sofia, border on Serbia and Macedonia, whereas Gabrovo is located in central Bulgaria. The value of the "agglomeration" factor (0.60) indicates an above average endowment with agglomerative characteristics leading to a GDP per capita which is slightly above the average of all 27 rural *oblasti*. This cluster is the most successful in attracting FDI (254 US$ per inh.), mainly based on Gabrovo as industrial location (FDI 691 US$ per inh.). The human capital is rather well-qualified, as shown by the educational level: the number of highly-educated inhabitants is above average, the number of lowly-educated below average. This goes in hand with the lowest share of minorities in total population (5 %) and a low share of people living in rural communities (27 %). The medical infrastructure is well above average: the number of physicians per 10,000 inhabitants is 43 compared with 35 as the average of all rural *oblasti*. Nevertheless, the population of cluster 4 is over-aged, as indicated by the lowest share of total population aged 0 to 19. Altogether, this is reflected in the lowest value of the marginality as well as the employment factor (-1.3 both). The growing service sector contributes to the lowest unemployment rate (12 %) of all clusters.

Cluster 5: More industrialised agrarian regions with relatively high income
(North-Central Bulgaria)

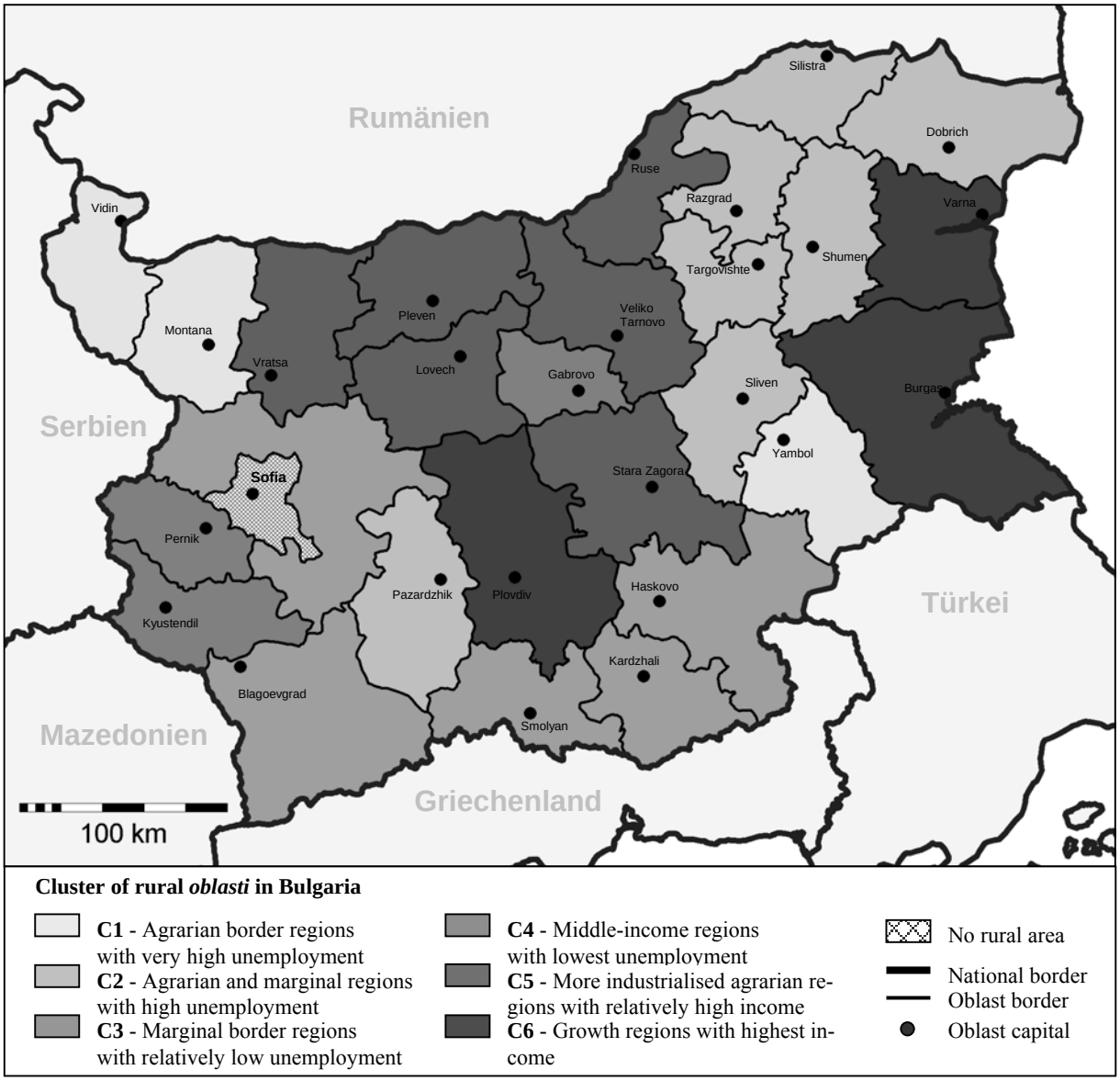
Cluster 5 is comprised of the six regions Vratsa, Pleven, Lovech, Veliko Tarnovo, Ruse and Stara Zagora which are both agrarian and industrially-oriented. Most of these *oblasti* are located in the fertile Danube plain bordering Romania. Agriculture is complemented by fertiliser manufacturing and the food industry. Both the gross value added in industry and in services are the second highest per capita among the six clusters, resulting in the second highest GDP p.c. The share of highly-educated reaches 74 per 1,000 inhabitants. Despite these positive economic figures, the unemployment rate (18 %) is not below average. Further characteristics of this cluster are the rather low shares of minorities (11 %) and those living in rural

communities. The factor values of this cluster are slightly above ("agglomeration", "employment") or slightly below average ("marginality").

Cluster 6: Growth regions with highest income
(East and central Bulgaria)

Cluster 6 comprises two regions at the Black Sea coast, Varna and Burgas, and Plovdiv which is in central Bulgaria. As expected, the value of the factor "agglomeration" is highest for this cluster, reaching 2.2. The GDP p.c. reaches 28 % of the EU-15 average, the highest value of all clusters. Both the gross value added of industry and services are the highest per capita among the six clusters contributing to an unemployment rate of 13 %, which is the second lowest of all clusters. The prospering character of cluster 6 is also mirrored by high FDI of 207 US$ per inhabitant, the well-developed telecommunication system (485 telephone lines per 1,000 inhabitants) and the quality of human capital taking the number of highly-educated as a proxy. Population density (97 inhabitants/km^2) is rather high compared with other regions in Bulgaria.

Map 2: Cluster of rural *oblasti* in Bulgaria



Source: TRAPP (2003).

In summary, three latent factors behind the spatial structure of rural Bulgaria could be identified by a factor analysis investigating 16 economic, socio-demographic, settlement and infrastructure variables. These factors are named "agglomeration", "marginality" and "employment" and emphasize the importance of agglomeration advantages, the relevance of minorities in Bulgaria as well as employment patterns. They can be used as starting point for Bulgarian regional policy. The subsequent cluster analysis of 27 rural *oblasti* (all except for the capital) carried out with the factor values resulted in the identification of six types of regions (cluster 1 to 6).

Comparing the results of this cluster analysis with those obtained for Bulgaria in the analysis for all ten CEECs (see section 2.2 with the Bulgarian rural regions fitting in cluster A, B and D) reveals some similarities, but also some differences. As expected, the analysis focussing only on Bulgaria results in a more differentiated picture of regional patterns. For example, all regions of the agrarian clusters 1, 2 and 5 (except for the *oblasti* Stara Zagora) are – on the CEECs level – part of cluster A ("Agrarian lowest income regions with very high unemployment"). All regions of cluster 3 "Marginal border regions" (except for the *oblasti* Sofia) are part of cluster B ("Agrarian low income regions"). However, Varna, a prospering growth region according to the Bulgarian cluster analysis, also belongs to cluster B. Unexpectedly, the 5 Bulgarian regions of cluster D ("More industrialized middle income regions") are grouped into 4 different clusters according to the cluster analysis focussing only on Bulgaria.

The differences in the grouping might be caused by a) the characteristics of the NUTS-3 regions of the other 9 CEECs, which clearly affect the identification of the CEEC-10 clusters, b) differing variables considered in the analyses and c) by the factor analysis which was only applied in the Bulgarian analysis (due to the greater number of partly correlated variables). In order to get an impression on the impact of these reasons, one could take the variables used in the CEEC-10 typology and apply the cluster analysis only for Bulgaria. Results show a relatively similarly classification pattern indicating a rather robustness in changes in the variables considered. This demonstrates that the spatial patterns of Bulgaria seems stable enough not to be strongly influenced by the choice of variables. In contrast, the size of the analysed region (only Bulgaria or all CEECs) has an visible effect on classification results.

4 WIDENING THE FOCUS: CHARACTERISTICS OF CEEC REGIONS COMPARED WITH EU-15 REGIONS – FIRST RESULTS OF A CLUSTER ANALYSIS FOR THE EU-24

To provide insight on the similarities of, and differences between rural areas in all of Europe, an additional cluster analysis on the NUTS-2 level, including the EU-15 Member States (without the United Kingdom due to a lack of data) alongside the CEECs was carried out. First results indicate a tendency to separate the CEE regions from those of the EU-15. The differences in GDP p.c. can be clearly seen (see Map 3 and Table 5 with the clusters ordered according to average GDP per capita of the respective cluster from lowest to highest).

Only the capitals Prague, (cluster IX) Bratislava (cluster VII) and Budapest, (cluster V) as well as Slovenia, (cluster VII) belong to clusters dominated by EU regions with high or middle incomes relative to the average of CEEC-10 + EU-14. The Czech Republic, except for its capital, and West-Hungary are, together with Ireland and Northern Portugal, included in the more industrialised cluster III, which already has an income below average. In the two groups with the lowest GDP p.c., there are only Central and Eastern European regions: The first cluster incorporates the agrarian lowest income regions of Romania and Bulgaria, and the second cluster low income regions with high unemployment in Poland, Slovakia and the Baltic States, as well as Sofia and Bucharest. Two clusters (VI and VIII) cover only regions of EU-14 Member States especially characterised by a rather old population structure. The result reveals large

differences in development between the regions of the European Union and the new Member States.

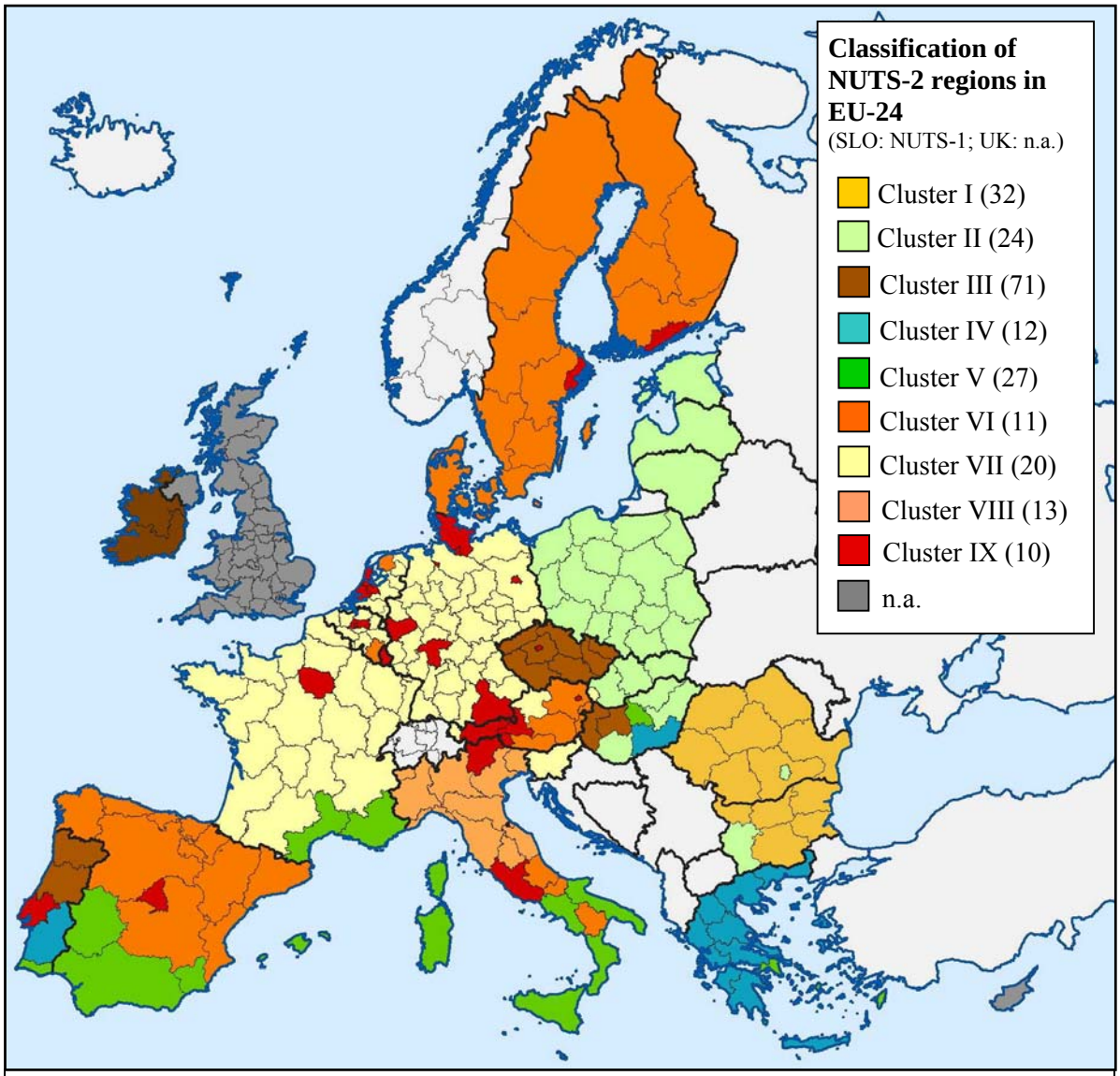
Table 5: Characteristics of the 9 clusters of NUTS-2 analysis (CEEC-10 + EU-14)

Cluster (number of regions)		Included in the cluster analysis											
		Population density [inh./km^2]	Share of total population aged 60 and over [%]	Share of total population aged 0-19 [%]	Infant mortality rate	GDP per capita [PPP]	Unemployment rate [%]	Average cereal yield [t/ha]	Absolute change in percentage share of value added of agriculture [% points]	Absolute change in percentage share of value added of industry [% points]	Absolute change in percentage share of value added of services [% points]	Share of value added of agriculture [%]	Share of value added of industry [%]
		1999	2000 [1)]	2000 [1)]	2000 [2)]	2000	2001	1998-2000 [3)]	1999-1995 [4)]	1999-1995 [4)]	1999-1995 [4)]	1999 [5)]	1999 [5)]
I	Av.[6)]	76.2	20.3	25.0	17.1	5329	14.5	2.5	0.1	-2.0	1.9	22.5	35.1
(12)	VC[7)]	0.20	0.15	0.09	0.16	0.11	0.68	0.04	32.00	-2.55	2.26	0.16	0.17
II	Av.[6)]	153.2	17.3	27.0	8.6	8293	16.8	2.9	-2.6	-2.5	5.1	5.5	33.4
(27)	VC[7)]	1.50	0.12	0.09	0.21	0.17	0.32	0.28	-0.73	-1.24	0.53	0.42	0.15
III	Av.[6)]	110.8	19.8	24.9	5.4	13194	6.4	4.2	-2.0	1.0	0.9	5.0	44.6
(13)	VC[7)]	0.45	0.17	0.12	0.37	0.39	0.56	0.26	-0.85	3.50	2.78	0.36	0.10
IV	Av.[6)]	54.6	25.0	21.8	6.4	13321	9.3	3.2	-3.7	-2.0	5.7	12.5	22.8
(13)	VC[7)]	0.41	0.11	0.07	0.30	0.17	0.34	0.53	-0.95	-1.95	0.47	0.28	0.36
V	Av.[6)]	188.2	26.5	24.3	5.6	16990	12.4	2.5	-.8	-0.8	1.5	4.7	18.4
(20)	VC[7)]	1.10	0.23	0.10	0.32	0.25	0.62	0.48	-0.88	-1.75	1.07	0.62	0.24
VI	Av.[6)]	72.3	37.7	22.3	3.9	19934	8.4	3.9	-0.9	0.2	0.6	4.6	32.8
(32)	VC[7)]	0.88	0.11	0.13	0.33	0.14	0.48	0.44	-0.78	6.50	1.83	0.52	0.13
VII	Av.[6)]	219.6	25.8	23.4	4.5	21113	7.3	6.8	-0.4	-1.5	2.0	2.6	31.6
(71)	VC[7)]	0.72	0.19	0.10	0.20	0.17	0.52	0.18	-1.50	-1.33	0.95	0.69	0.18
VIII	Av.[6)]	186.3	44.7	16.4	4.4	26302	4.5	6.2	-0.5	-2.5	3.0	2.4	29.3
(10)	VC[7)]	0.53	0.11	0.08	0.30	0.09	0.18	0.37	-0.60	-0.68	0.50	0.29	0.20
IX	Av.[6)]	1153.9	28.1	22.0	4.3	30741	5.5	5.8	-0.2	-1.7	1.9	1.0	21.3
(24)	VC[7)]	1.29	0.19	0.10	0.21	0.23	0.60	0.33	-1.50	-0.76	0.68	0.90	0.22
All	Av.[6)]	263.2	27.0	23.4	5.9	18514	9.2	4.8	-1.0	-1.3	2.3	5.0	30.0
(222)	VC[7)]	2.25	0.30	0.14	0.58	0.42	0.65	0.46	-1.80	-2.00	1.13	1.06	0.27

Notes : [1)] EST 2001, LV 1999.
[2)] LT, LV, SLO 1999.
[3)] BG, SLO 1996-1998; PL 2000; LV, ROM 1999.
[4)] BG, EST, LT, LV 1996-1999; ROM 1997-1999.
[5)] ROM 1997.
[6)] Unweighted arithmetic mean value.
[7)] Variation coefficient.

Source: WEINGARTEN and BAUM (2003) based on EUROSTAT's Newcronos Regio data.

Map 3: Clusters of NUTS-2 regions in EU-24 (without UK)



I. Agrarian lowest income regions with low cereal yields (as a proxy for agricultural productivity) and high infant mortality
II. Low income regions with high unemployment, average shares of the economic sectors and young population
III. More industrialised regions with rather low unemployment and below-average income
IV. Low populated regions with an income below average, a decreasing share of agriculture and strongly expanding share of services
V. Touristic middle income regions with an income slightly below average and high share of services
VI. Developed, less populated middle income regions with an over-aged population
VII. Developed and densely populated high income regions with low share of agriculture but highest cereal yields
VIII. Developed high income regions with an over-aged population and low unemployment
IX. Capitals and other highest income regions with very high share of services and low unemployment

Note: The number of regions in each cluster is given in parentheses.
Source: WEINGARTEN and BAUM (2003) based on EUROSTAT´s NewCronos Regio data.

5 SUMMARY

Despite some common features, rural areas cannot be considered homogeneous. They are much more heterogeneous than a generalised comparison with urban areas might indicate.

Rather, they have specific characteristics which can differ within a country and even more across countries. This paper provides a typology of CEEC-10 NUTS-3 regions according to demographic and socio-economic criteria. The cluster analysis carried out revealed five different types of regions as the most adequate result: three are largely rural, one includes both rural, and especially industrialised urban areas, and one covers only large cities. The results show that, besides regional disparities in the CEECs, there are large economic differences between urban areas (cluster E) on the one hand and rural areas (cluster A-C) on the other hand. In addition, the results confirm general statements like "over-aged rural population" are not appropriate.

Narrowing the geographical focus to a single country, in general improves data availability and allows to include more variables. If they are correlated, a factor analysis is recommended to analyse the underlying structure of the data set. In our case, Bulgaria, the 16 variables considered on the NUTS-3 level could be condensed to three factors: "agglomeration", "marginality" and "employment". Based on these factors, six groups of regions could be identified. However, in order to design concrete policy measures adapted to the peculiarities of the specific regions, more detailed cluster analyses – on a more disaggregated regional level including additional variables – proved to be necessary.

Widening the geographical focus to the enlarged European Union provided insight on the similarities of, and differences between rural areas in the EU-15 (except for the United Kingdom due to a lack of data) and the CEECs. The first results of this NUTS-2 cluster analysis with 12 demographic, socio-economic and agricultural variables reveal large differences in development between the regions of the EU and the CEECs. Two of the nine clusters identified cover only CEE regions, another two only EU-15 regions. Of the remaining five, four are dominated by current EU regions and only one cluster is rather mixed.

In principle, the cluster analysis as an explorative method can be considered as suitable for classifying regions. Revealing so far unknown regional structures and coherences and, thus, contributing to new insights it can motivate argumentations of regional policy and contribute to initiate political effects. However, its results are always partially subjective since the researcher has relatively high "freedom" and responsibility to decide on variables, the distance measure, the algorithm for clustering and the most appropriate number of clusters.

The three typologies presented for different geographical areas provide no code of practice for regional policy measures, but first clues for the elaboration of rural development measures in CEE. For regional policy to systematically address the respective "bottle-necks" of regional development, an approach which is more focused on the *reasons* for socio-economic differences is desirable. However, this is connected with numerous methodological problems as a result of the still-insufficient existing theoretical basis (KLEMMER and JUNKERNHEINRICH 1990) and remains a field for further research. For many analyses, it is necessary to bring "order" to the regional data to better understand its basic structure. Cluster analyses can do this and, thus, stimulate political debate and provide a foundation for more refined analyses.

REFERENCES

BAUM, S., WEINGARTEN, P. (2004): Interregionale Dispariäten und Entwicklung ländlicher Räume als regionalpolitische Herausforderung für die neuen EU-Mitgliedstaaten, *IAMO Discussion Paper No. 61*, Halle (Saale), <http://www.iamo.de/dok/dp61.pdf>.

BROWN, D. L., SCHAFFT, K. A. (2002): Population deconcentration in Hungary during the post-socialist transformation, *Journal of rural studies 18* , pp. 233-244.

DOMANSKI, B. (1998): Erfolgssuche in einer Problemregion, Gliwice/Gleiwitz, Oberschlesien, *Geographische Rundschau 50, 1*, pp. 35-41.

ECKEY, H.-F., KOSFELD, R., RENGERS, M. (2002): Multivariate Statistik. Grundlagen – Methoden – Beispiele, Wiesbaden.

FÖRSTER, H. (1999): Entwicklungsprobleme altindustrialisierter Gebiete im Transformationsprozess, in: PÜTZ, R. (ed.): Ostmitteleuropa im Umbruch, Wirtschafts- und sozialgeographische Aspekte der Transformation, Mainz, pp. 21-36.

HAIR, J. F., ANDERSON, R. E., TATHAM, R. L., BLACK, W. C. (1998): Multivariate Data Analysis, Fifth edition, Upper Saddle River, New Jersey.

ILIEVA, M., SCHMIDT, C., WAACK, C. (2002): Bulgariens administrative Neugliederung – die Einführung von neuen Verwaltungseinheiten und Planungsregionen als Vorbereitung auf eine zukünftige EU-Mitgliedschaft, *Europa regional 10, 1*, pp. 28-37.

KEUNE, M. (2000): Employment problems and regional differences in Central and Eastern Europe: The need for local development initiatives, in: PETRAKOS, G. (ed.): Integration and transition in Europe: The economic geography of interaction, London, pp. 187-199.

KLEMMER, P., JUNKERNHEINRICH, M. (1990): Regionstypenbezogene Fortentwicklung der Raumentwicklungspolitik. Typisierung von Arbeitsmarktregionen anhand ausgewählter Bestimmungsfaktoren des regionalen Entwicklungspotentials, in: AKADEMIE FÜR RAUMFORSCHUNG UND LANDESPLANUNG (ed.): Räumliche Typisierung für die Raumentwicklungspolitik, Hannover, pp. 1-61.

EUROPÄISCHE KOMMISSION (2002): Portrait der Wirtschaft der Europäischen Union 2002, Themenkreis 2: Wirtschaft und Finanzen, Luxemburg.

EUROPÄISCHE KOMMISSION, GENERALDIREKTION LANDWIRTSCHAFT (GD VI) (1997): CAP 2000 Arbeitspapier Entwicklung des ländlichen Raums, <europa.eu.int/comm/agriculture/publi/pac2000/rd/rd_de.pdf>.

NETWORK OF INDEPENDENT AGRICULTURAL EXPERTS IN THE CEE CANDIDATE COUNTRIES (2004): The Future of Rural Areas in the Candidate Countries, Halle (Saale), <http://europa.eu.int/comm/agriculture/publi/reports/ccrurdev/text_en.pdf>.

ROVAN, J., SAMBT, J. (2003): Socio-economic Differences Among Slovenian Municipalities: A Cluster Analysis Approach, in: FERLIGOJ, A., MRVAR, A. (eds.): Developments in Applied Statistics, Metodološki zvezki 19, Ljubljana, pp. 265-278.

SAILER, U. (2001a): Ausländische Direktinvestitionen in Ungarn, *Geographische Rundschau 53, 7/8*, pp. 38-43.

SAILER, U. (2001b): Landwirtschaft in Ungarn, *Geographische Rundschau 53, 11*, pp. 36-41.

SIEBERT, R. (2001): Social Change and Trends in Rural Areas, in: GOETZ, S. J., JAKSCH, T., SIEBERT, R. (eds.): Agricultural Transformation and Land Use in Central and Eastern Europe, Aldershot, pp. 57-69.

SMITH, A. J., FERENCIKOVA, S. (1998): Inward investment, regional transformations and uneven development in Eastern and Central Europe: enterprise case-studies from Slovakia, *European urban and regional studies 5, 2*, pp. 155-173.

THIEL, E., CRINIUS, W. (1990): Raumkategorien und raumordnungspolitische Maßnahmen. Probleme einer regionstypenbezogenen Raumentwicklungspolitik, in: AKADEMIE FÜR RAUMFORSCHUNG UND LANDESPLANUNG (ed.): Räumliche Typisierung für die Raumentwicklungspolitik, Hannover, pp. 63-111.

TIMM, N. H. (2002): Applied Multivariate Analysis, New York.

TRAPP, C. (2003): Raumwirtschaftliche Differenzierung ländlicher Räume in Bulgarien, Diploma thesis, University Halle-Wittenberg (unpublished).

TREATY ESTABLISHING THE EUROPEAN COMMUNITY (2002): Consolidated Version, *Official Journal C 325 of 24 December*, <http://europa.eu.int/eur-lex/en/treaties/dat/EC_consol.pdf>.

UNITED NATIONS ORGANISATION (2002): Human Development Index, United Nations Development Programme, Sofia.

WEINGARTEN, P., BAUM, S. (2003): Current situation and future prospects of rural areas in the Central and East European Candidate Countries, Paper presented at the Conference "EU-Enlargement – Chances and Risks for the Rural Area" organised by the Slovenian Society of Agricultural Economists and the Austrian Society of Agricultural Economists September 18-19, Ljubljana.

WIEßNER, R. (1999): Innerstädtische Disparitäten in Budapest, *Praxis Geographie 29, 9*, pp. 16-21.

WINDHORST, H.-W. (2000): Nachhaltige Entwicklung ländlicher Räume – ein kritisches Statement, in: MOSE, I., WEIXLBAUMER, N. (eds.): Regionen mit Zukunft?, Nachhaltige Regionalentwicklung als Leitbild ländlicher Räume, *Materialien Umweltwissenschaften Vechta MUWV 8*, Vechta.

WORLDBANK, HUMAN DEVELOPMENT SECTOR UNIT, EUROPE AND CENTRAL ASIA REGION (1999): Bulgaria, Poverty During the Transition, *Report No. 18411*, <http://www-wds.worldbank.org/servlet/WDSConten-Server/WDSP/IB/1999/09/14/000094946_9907220841140/Rendered/PDF/multi_page.pdf>.

DISCUSSION PAPERS
DES INSTITUTS FÜR AGRARENTWICKLUNG
IN MITTEL- UND OSTEUROPA (IAMO)

DISCUSSION PAPERS
OF THE INSTITUTE OF AGRICULTURAL DEVELOPMENT
IN CENTRAL AND EASTERN EUROPE (IAMO)

No. 1 FROHBERG, K., HARTMANN, M. (1997):
Promoting CEA Agricultural Exports through Association Agreements with the EU – Why is it not working?

No. 2 FROHBERG, K., HARTMANN, M. (1997):
Comparing Measures of Competitiveness: Examples for Agriculture in the Central European Associates

No. 3 POGANIETZ, W. R., GLAUCH, L. (1997):
Migration durch EU-Integration? Folgen für den ländlichen Raum

No. 4 WEINGARTEN, P. (1997):
Agri-Environmental Policy in Germany – Soil and Water Conversation –

No. 5 KOPSIDIS, M. (1997):
Marktintegration und landwirtschaftliche Entwicklung: Lehren aus der Wirtschaftsgeschichte und Entwicklungsökonomie für den russischen Getreidemarkt im Transformationsprozeß

No. 6 PIENIADZ, A. (1997):
Der Transformationsprozeß in der polnischen Ernährungsindustrie von 1989 bis 1995

No. 7 POGANIETZ, W. R. (1997):
Vermindern Transferzahlungen den Konflikt zwischen Gewinnern und Verlierern in einer sich transformierenden Volkswirtschaft?

No. 8 EPSTEIN, D. B., SIEMER, J. (1998):
Difficulties in the Privatization and Reorganization of the Agricultural Enterprises in Russia

No. 9 GIRGZDIENE, V., HARTMANN, M., KUODYS, A., RUDOLPH, D., VAIKUTIS, V., WANDEL, J. (1998):
Restructuring the Lithuanian Food Industry: Problems and Perspectives

No. 10 JASJKO, D., HARTMANN, M., KOPSIDIS, M., MIGLAVS, A., WANDEL, J. (1998):
Restructuring the Latvian Food Industry: Problems and Perspectives

No. 11 SCHULZE, E., NETZBAND, C. (1998):
Ergebnisse eines Vergleichs von Rechtsformen landwirtschaftlicher Unternehmen in Mittel- und Osteuropa

No. 12 BERGSCHMIDT, A., HARTMANN, M. (1998):
Agricultural Trade Policies and Trade Relations in Transition Economies

No. 13 ELSNER, K., HARTMANN, M. (1998):
Convergence of Food Consumption Patterns between Eastern and Western Europe

No. 14 FOCK, A., VON LEDEBUR, O. (1998):
Struktur und Potentiale des Agraraußenhandels Mittel- und Osteuropas

No. 15 ADLER, J. (1998):
Analyse der ökonomischen Situation von Milchproduktionsunternehmen im Oblast Burgas, Bulgarien

No. 16 PIENIADZ, A., RUDOLPH, D. W., WANDEL, J. (1998):
Analyse der Wettbewerbsprozesse in der polnischen Fleischindustrie seit Transformationsbeginn

No. 17 SHVYTOV, I. (1998):
Agriculturally Induced Environmental Problems in Russia

No. 18 SCHULZE, E., TILLACK, P., DOLUD, O., BUKIN, S. (1999):
Eigentumsverhältnisse landwirtschaftlicher Betriebe und Unternehmen in Rußland und in der Ukraine – Befragungsergebnisse aus den Regionen Nowosibirsk und Shitomir

No. 19 PANAYOTOVA, M., ADLER, J. (1999):
Development and Future Perspectives for Bulgarian Raw Milk Production towards EU Quality Standards

No. 20 WILDERMUTH, A. (1999):
What Kind of Crop Insurance for Russia?

No. 21 GIRGZDIENE, V., HARTMANN, M., KUODYS, A., VAIKUTIS, V., WANDEL, J. (1999):
Industrial Organisation of the Food Industry in Lithuania: Results of an Expert Survey in the Dairy and Sugar Branch

No. 22 JASJKO, D., HARTMANN, M., MIGLAVS, A., WANDEL, J. (1999):
Industrial Organisation of the Food Industry in Latvia: Results of an Expert Survey in the Dairy and Milling Branches

No. 23 ELSNER, K. (1999):
Analysing Russian Food Expenditure Using Micro-Data

No. 24 PETRICK, M., DITGES, C. M. (2000):
Risk in Agriculture as Impediment to Rural Lending – The Case of North-western Kazakhstan

No. 25 POGANIETZ, W. R. (2000):
Russian Agri-Food Sector: 16 Months After the Breakdown of the Monetary System

No. 26 WEBER, G., WAHL, O., MEINLSCHMIDT, E. (2000):
Auswirkungen einer EU-Osterweiterung im Bereich der Agrarpolitik auf den EU-Haushalt
(steht nicht mehr zur Verfügung – aktualisierte Version DP 42)

No. 27 WAHL, O., WEBER, G., FROHBERG, K. (2000):
Documentation of the Central and Eastern European Countries Agricultural Simulation Model (CEEC-ASIM Version 1.0)

No. 28 PETRICK, M. (2000):
Land Reform in Moldova: How Viable are Emerging Peasant Farms? An assessment referring to a recent World Bank study

No. 29 WEINGARTEN, P. (2000):
Buchbesprechung: BECKMANN, V. (2000): Transaktionskosten und institutionelle Wahl in der Landwirtschaft : Zwischen Markt, Hierarchie und Kooperation

No. 30 BROSIG, S. (2000):
A Model of Household Type Specific Food Demand Behaviour in Hungary

No. 31 UVAROVSKY, V., VOIGT, P. (2000):
Russia's Agriculture: Eight Years in Transition – Convergence or Divergence of Regional Efficiency

No. 32 SCHULZE, E., TILLACK, P., GERASIN, S. (2001):
Eigentumsverhältnisse, Rentabilität und Schulden landwirtschaftlicher Großbetriebe im Gebiet Wolgograd

No. 33 KIELYTE, J. (2001):
Strukturwandel im baltischen Lebensmittelhandel

No. 34 ШУЛЬЦЕ, Э., ТИЛЛАК, П., ГЕРАСИН, С. (2001):
Отношения собственности, рентабельность и долги крупных сельскохозяйственных предприятий в Волгоградской области

No. 35 FROHBERG, K., HARTMANN, M. (2002):
Konsequenzen der Integration im Agrar- und Ernährungssektor zwischen Beitrittsländern und EU-15

No. 36 PETRICK, M. (2001):
Documentation of the Poland farm survey 2000

No. 37 PETRICK, M., SPYCHALSKI, G., ŚWITŁYK, M., TYRAN, E. (2001):
Poland's Agriculture: Serious Competitor or Europe's Poorhouse? Survey results on farm performance in selected Polish voivodships and a comparison with German farms

No. 38 HOCKMANN, H., KASHTANOVA, E., KOWSCHIK, S. (2002):
Lage und Entwicklungsprobleme der weißrussischen Fleischwirtschaft

No. 39 SCHULZE, E., TILLACK, P., PATLASSOV, O. (2002):
Einflussfaktoren auf Gewinn und Rentabilität landwirtschaftlicher Großbetriebe im Gebiet Omsk, Russland

No. 40 ШУЛЬЦЕ, Э., ТИЛЛАК, П., ПАТЛАССОВ, О. (2002):
Факторы, влияющие на прибыль и рентабельность крупных сельскохозяйственных предприятий в Омской области в России

No. 41 BAVOROVÁ, M. (2002):
Entwicklung des tschechischen Zuckersektors seit 1989

No. 42 FROHBERG, K., WEBER, G. (2002):
Auswirkungen der EU-Osterweiterung im Agrarbereich

No. 43 PETRICK, M. (2002):
Farm investment, credit rationing, and public credit policy in Poland
– A microeconometric analysis –

No. 44 KEDAITIENE, A., HOCKMANN, H. (2002):
Milk and milk processing industry in Lithuania: An analysis of horizontal and vertical integration

No. 45 PETRICK, M. (2003):
Empirical measurement of credit rationing in agriculture: A methodological survey

No. 46 PETRICK, M., LATRUFFE, L. (2003):
Credit access and borrowing costs in Poland's agricultural credit market: A hedonic pricing approach

No. 47 PETRICK, M., BALMANN, A., LISSITSA, A. (2003):
Beiträge des Doktorandenworkshops zur Agrarentwicklung in Mittel- und Osteuropa 2003

No. 48 SCHULZE, E., TILLACK, P., MOSASHWILI, N. (2003):
Zur wirtschaftlichen Situation georgischer Landwirtschaftsbetriebe

No. 49 ЛИССИТСА, А., БАБИЧЕВА, Т. (2003):
Теоретические основы анализа продуктивности и эффективности сельскохозяйственных предприятий

No. 50 ЛИССИТСА, А., БАБИЧЕВА, Т. (2003):
Анализ Оболочки Данных (DEA) – Современная методика определения эффективности производства

No. 51 ЛИССИТСА, А., ОДЕНИНГ, М., БАБИЧЕВА, Т. (2003):
10 лет экономических преобразований в сельском хозяйстве Украины – Анализ эффективности и продуктивности предприятий

No. 52 LISSITSA, A., STANGE, H. (2003):
Russischer Agrarsektor im Aufschwung? Eine Analyse der technischen und Skalen-Effizienz der Agrarunternehmen

No. 53 VALENTINOV, V. (2003):
Social capital, transition in agriculture, and economic organisation: A theoretical perspective

No. 54 BORKOWSKI, A. (2003):
Machtverteilung im Ministerrat nach dem Vertrag von Nizza und den Konventsvorschlägen in einer erweiterten Europäischen Union

No. 55 KISS, P., WEINGARTEN, P. (2003):
Cost of compliance with the acquis communautaire in the Hungarian dairy sector

No. 56 WEINGARTEN, P., FROHBERG, K., WINTER, E., SCHREIBER, C. (2003):
Quantitative Analysis of the Impacts of Croatia's Agricultural Trade Policy on the Agri-food Sector

No. 57 БОКУШЕВА, Р., ХАЙДЕЛЬБАХ, О. (2004):
Актуальные аспекты страхования в сельском хозяйстве

No. 58 DERLITZKI, R., SCHULZE, E. (2004):
Georg Max Ludwig Derlitzki (1889-1958)

No. 59 VŐNEKI, E. (2004):
Zur Bewertung des Ungarischen SAPARD-Programms unter besonderer Berücksichtigung der Investitionen im Milchsektor

No. 60 ЧИМПОЕШ, Д., ШУЛЬЦЕ, Э. (2004):
Основные экономические проблемы сельского хозяйства Молдовы

No. 61 BAUM, S, WEINGARTEN, P. (2004):
Interregionale Disparitäten und Entwicklung ländlicher Räume als regionalpolitische Herausforderung für die neuen EU-Mitgliedstaaten

No. 62 PETRICK, M. (2004):
Can econometric analysis make (agricultural) economics a hard science? Critical remarks and implications for economic methodology

No. 63 SAUER, J. (2004):
Rural Water Suppliers and Efficiency – Empirical Evidence from East and West Germany

No. 64 PETRICK, M., BALMANN, A. (2004):
Beiträge des 2. Doktorandenworkshops zur Agrarentwicklung in Mittel- und Osteuropa 2004

No. 65 BOJNEC, S., HARTMANN, M. (2004):
Agricultural and Food Trade in Central and Eastern Europe: The Case of Slovenian Intra-Industry Trade

No. 66 GLITSCH, K, EERITS, A. (2004):
Der slowakische Markt für Milch und Milchprodukte – vom Beginn der Transformation bis zum EU-Beitritt

No. 67 FISCHER, C. (2004):
Assessing Kosovo's horticultural potential – The market for fruit and vegetables on the balkans

No. 68 PETRICK, M., SCHREIBER, C., WEINGARTEN, P. (2004):
Competitiveness of milk and wine production and processing in Albania

No. 69 ШТАНГЕ, Г., ЛИССИТСА, А. (2004):
Аграрный сектор России на подъеме?! Анализ технической эффективности аграрных предприятий

No. 70 SAUER, J. (2004):
Die Ökonomie der (Ländlichen) Wasserversorgung

No. 71 HAPPE, K., BALMANN, A., KELLERMANN, K. (2004):
The Agricultural Policy Simulator (Agripolis) – An agent-based model to study structural change in agriculture (Version 1.0)

No. 72 BAUM, S., TRAPP, CH., WEINGARTEN, P. (2004):
Typology of rural areas in the Central and Eastern European EU new Member States

Die Discussion Papers sind erhältlich beim Institut für Agrarentwicklung in Mittel- und Osteuropa (IAMO) oder im Internet unter http://www.iamo.de.

The Discussion Papers can be ordered from the Institute of Agricultural Development in Central and Eastern Europe (IAMO). Use our download facility at http://www.iamo.de.