



UNIVERSITY OF LEEDS

This is a repository copy of *Internal Migration and Regional Population Dynamics in Europe: Denmark Case Study*.

White Rose Research Online URL for this paper:
<http://eprints.whiterose.ac.uk/5018/>

Monograph:

Kupiszewki, M., Illeries, S., Durham, H. et al. (1 more author) (2001) *Internal Migration and Regional Population Dynamics in Europe: Denmark Case Study*. Working Paper. School of Geography , University of Leeds.

School of Geography Working Paper 01/02

Reuse

See Attached

Takedown

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.



eprints@whiterose.ac.uk
<https://eprints.whiterose.ac.uk/>

WORKING PAPER 01/02

**INTERNAL MIGRATION AND
REGIONAL POPULATION DYNAMICS IN EUROPE:
DENMARK CASE STUDY**

Marek Kupiszewski^{1,2}
Sven Illeris³
Helen Durham¹
Philip Rees¹

¹School of Geography
The University of Leeds
Leeds LS2 9JT, UK

²Institute of Geography and Spatial Organisation
Polish Academy of Sciences
Twarda 51/55
00-818 Warsaw, Poland

³Department of Geography
Roskilde University
PO Box 260
4000 Denmark

PUBLISHED MAY 2001

ALL RIGHTS RESERVED

For further copies contact the Working Paper Secretary,
School of Geography, University of Leeds, Leeds LS2 9JT
Telephone 0113 233 3300

CONTENTS

	Page
LIST OF TABLES	v
LIST OF FIGURES	v
ABSTRACT	vi
ACKNOWLEDGMENTS	vi
1. CONTEXT	1
2. INTERNAL MIGRATION AND POPULATION CHANGE REVIEWED	2
3. METHODS USED AND DATA EMPLOYED	6
3.1 Geographical scale, geographical units and variables used	6
3.2 Digital boundaries and mapping techniques	6
3.3 Variables and key indicators used	6
3.3.1 <i>Population and population change data</i>	8
3.3.2 <i>Migration</i>	8
3.3.3 <i>Births and deaths</i>	9
3.3.4 <i>Population density</i>	9
3.3.5 <i>Size class of communes</i>	10
3.3.6 <i>Classification by the level of urbanisation and commuting patterns</i>	10
3.3.7 <i>The economic classification of communes</i>	11
3.3.8 <i>Unemployment</i>	11
4. THE PATTERN OF INTERNAL MIGRATION BETWEEN COMMUNES THROUGH THE LIFE COURSE, 1985 AND 1998	13
4.1 In-migration patterns	13
4.1.1 <i>Total in-migration</i>	13
4.1.2 <i>In-migration in the family and older labour force ages</i>	14
4.1.3 <i>In-migration in the retirement and elderly ages</i>	14
4.1.4 <i>In-migration in the adolescent and young adult ages</i>	17
4.2 Out-migration patterns	17
4.2.1 <i>Total out-migration</i>	17
4.2.2 <i>Out-migration in the family and older labour force ages</i>	18
4.2.3 <i>Out-migration in the retirement and elderly ages</i>	21
4.2.4 <i>Out-migration in the adolescent and young adult ages</i>	21
4.3 Net migration patterns	22
4.3.1 <i>Total net migration</i>	22
4.3.2 <i>Net migration in the family and older labour force ages</i>	25
4.3.3 <i>Net migration in the retirement and elderly ages</i>	26
4.3.4 <i>Net migration in the adolescent and young adult ages</i>	26

CONTENTS (Continued)

	Page
5. POPULATION CHANGE BY COMMUNE 1985-1998	28
5.1 Population change in Denmark by communes 1985-1998	28
5.2 The demographic sources of population change	30
6. RELATIONSHIP OF INTERNAL MIGRATION TO THE URBAN SYSTEM	34
6.1 Relationship of migration to settlement size	34
6.2 Relationship of migration to population density	37
6.3 Relationship to migration to the classification of communes based on their size and commuting pattern	41
7. RELATIONSHIP OF INTERNAL MIGRATION TO THE ECONOMIC CLASSIFICATION OF COMMUNES	44
8. RELATIONSHIP OF INTERNAL MIGRATION TO UNEMPLOYMENT	47
9. SUMMARY AND CONCLUSIONS	50
REFERENCES	54

LIST OF TABLES

	Page
1: Population change, natural increase, net migration, total fertility rate and life expectancy, Denmark 1960–1998	3
2: Classification of communes based on their size and commuting pattern	10
3: Economic classification of communes based on the structure of employment by communes by place of work in 1998	11
4: Types of population growth in Denmark in 1998	30
5: Net migration and migration effectiveness ratios by size band, Denmark, 1998	36
6: Population change by size band, Denmark, 1985–1998	37
7: Net migration and migration effectiveness ratios by population density band, Denmark, 1998	38
8: Population change by population density band, Denmark, 1985–1998	40
9: Net migration and migration effectiveness ratios by type of commune, Denmark, 1998	41
10: Population change by type of commune bands, Denmark, 1998	43
11: Net migration and migration effectiveness ratios by economic type band, Denmark, 1998	46
12: Population change by economic type bands, Denmark, 1985–1998	46
13: Net migration and migration effectiveness ratios by rate of unemployment band, Denmark, 1998	49
14: Population change by rate of unemployment bands, Denmark, 1998	49

LIST OF FIGURES

	Page
1: The municipalities and counties of Denmark	7
2: In-migration rates by municipalities in Denmark, 1985	15
3: In-migration rates by municipalities in Denmark, 1998	16
4: Out-migration rates by municipalities in Denmark, 1985	19
5: Out-migration rates by municipalities in Denmark, 1998	20
6: Net migration rates by municipalities in Denmark, 1985	23
7: Net migration rates by municipalities in Denmark, 1998	24
8: Population change in Denmark by communes 1985-1998	29
9: The Webb classification of municipalities in Denmark, 1998	31
10: Municipalities in Denmark by size of population, 1998	35
11: Municipalities in Denmark by density of population, 1998	39
12: The classification of municipalities in Denmark according to commuting and urbanisation patterns, 1998	42
13: The economic classification of municipalities in Denmark, 1998	45
14: Municipalities in Denmark by unemployment rate, 1998	48

ACKNOWLEDGMENTS

This Report was financed through research award R00237685 from the Economic and Social Research Council on *Internal Migration and Population Change in Europe: a Comparative Study* with support of the Council of Europe (Directorate of Social and Economic Affairs, Population and Migration Division).

ABSTRACT

This report analyses the patterns of internal migration and population change across the communes of Denmark as part of a multi-country study of regional population dynamics in Europe, comparing the 1980s and 1990s. Section 2 of the report reviews the recent history of internal migration and regional/local population change in Denmark. Section 3 documents data sources and structure. Section 4 provides a detailed cartographic analysis of the patterns of in-migration, out-migration and net-migration at commune level for 1985 and 1998 (the years selected for study), while section 5 reviews population change between 1985 and 1998. Overall net migration shifts have decreased between the two years. The spatial pattern combines losses from peripheral regions (western Jutland, Bornholm) and Copenhagen suburbs with gains to commuting belts centred on Copenhagen and the other large towns. As many other high income European countries, there is a profound contrast between the migration behaviour of young people and other adults (families, older workers and the retired). Young people move strongly towards the centre of the capital region and other large towns, while the other groups deconcentrate. Section 6 analyses the relationships between net migration/population change and the settlement system, to calibrate more precisely the patterns observed on the maps, while sections 7 and 8 look at the relationships between internal migration and economic/functional classifications of the communes. The former relationships are stronger than the latter, but are not as well clearly structured with respect to the urban hierarchy or population density as in many other countries studied. Denmark has reached a system state beyond simple counterurbanisation to be characterised by periurbanisation in the Copenhagen region, reurbanisation in Copenhagen itself and moderate outflows from rural regions.

1. CONTEXT

This study is funded by a research grant of the Economic and Social Research Council on *Internal Migration and Population Change in Europe: a Comparative Study* and constitutes a continuation of a research project on Internal Migration and Regional Population Dynamics in Europe commissioned to the School of Geography of the University of Leeds by the Council of Europe and the European Commission over the period 1995-1998. Within the ESRC project eight countries evenly distributed across Europe have been studied, adding to earlier ten case studies completed within the Council of Europe and the European Commission funded project, providing in total 18 case studies based on a unified methodology and analysing spatial units at similar geographical scales in each country. The results are as comparable as possible, keeping in mind differences in how migration is defined and operational differences in how migration data are being captured by National Statistical Offices.

2. INTERNAL MIGRATION AND POPULATION CHANGE REVIEWED

In the entire post-war period except for 1981 to 1984, the Danish population has been growing. Between 1950 and 1973 annual increases exceeded 30 thousand per year in the majority of years (Table1). Later the net change dropped to reach a loss of 5 thousand in 1981 but then grew to a healthy gain of 35 thousand a year in 1995. Since then the increases have oscillated around 20 thousand a year (0.4 %). The components making up these changes have evolved over time. Until the early 1990s international migration did not play any significant role in the population change, varying around 1-3 thousand net gains in the 1960s, showing substantial ups and downs in the 1970s and the 1980s and growing fast in the 1990s to reach in 1995 a high net gain of just over 28.5 thousand. Net migration then decreased in the second half of the 1990s to 11 thousand in 1998 (0.2 %). In the 1960s the main engine of growth was strong natural increase of over 30 thousand persons a year. In the 1970s the growth became weaker to turn negative, briefly, in the early 1980s. In the 1990s the natural increase has been moderate with several thousand more births than deaths (0.1-0.2 %). As the number of deaths has been relatively stable, with a small upward tendency due to ageing of the population, the total fertility rate (TFR) fluctuated from above 2.5 in early 1960s to 2.12 in 1968 (the last year with fertility above replacement level) to a minimal values below 1.5 in the early 1980s. The TFR rebounded to over 1.7 after 1992. Maintaining a below replacement fertility of a long time must lead to population decrease.

In this situation, population growth is secured by a positive net international migration. As Hansen (1995) shows, international immigration continuing at the level observed in early 1990s would prevent the Danish population from decrease. However, he observed that “to find political ways to deal with the social impacts of external migration and below-replacement reproduction in a responsible, balanced, and yet realistic manner, stands out as

Table 1: Population change, natural increase, net migration, total fertility rate and life expectancy, Denmark 1960-1998

Year	Population on 31 Dec.	Births	Deaths	Natural change	Net migration	Increase/decrease	TFR	Life expectancy	
								males	females
1960	4600842	76077	43681	32396	2991	35387	2.57	70.5	74.0
1961	4629624	76439	43310	33129	2745	35874	2.55	70.6	74.4
1962	4665829	77808	45334	32474	3731	36205	2.55	70.4	74.4
1963	4703136	82413	45773	36640	667	37307	2.64	70.5	74.5
1964	4741008	83356	46811	36545	1327	37872	2.60		
1965	4779399	85796	47884	37912	479	38391	2.61		
1966	4817746	88332	49344	38988	1743	40731	2.61		
1967	4852962	81410	47836	33574	1642	35216	2.35		
1968	4876803	74543	47290	27253	-3412	23841	2.12		
1969	4906916	71298	47943	23355	6758	30113	2.00		
1970	4941072	70802	48233	22569	11587	34156	1.95	70.9	75.9
1971	4980499	75359	48858	26501	3400	29901	2.04	70.9	76.2
1972	5006151	75505	50445	25060	5438	30498	2.03	70.8	76.2
1973	5041152	71895	50526	21369	12245	33614	1.92	71.0	76.5
1974	5049269	71327	51637	19690	-6605	13085	1.90	71.0	76.8
1975	5066873	72071	50895	21176	-8713	12463	1.92	71.3	77.0
1976	5079899	65267	54001	11266	3320	14586	1.75	70.9	76.7
1977	5097106	61878	50485	11393	5834	17227	1.66	71.8	77.7
1978	5111455	62036	52864	9172	5324	14496	1.67	71.5	77.4
1979	5121799	59464	54654	4810	5452	10262	1.60	71.2	77.4
1980	5123817	57293	55939	1354	398	1752	1.55	71.2	77.2
1981	5118874	53089	56359	-3270	-1845	-5115	1.44	71.3	77.4
1982	5116340	52658	55368	-2710	-105	-2815	1.43	71.6	77.6
1983	5111849	50822	57156	-6334	1719	-4615	1.38	71.5	77.5
1984	5110803	51800	57109	-5309	3982	-1327	1.40	71.7	77.7
1985	5115978	53749	58378	-4629	9499	4870	1.45	71.6	77.5
1986	5124489	55312	58100	-2788	11004	8216	1.48	71.8	77.6
1987	5129052	56221	58136	-1915	6173	4258	1.50	71.8	77.8
1988	5129621	58844	58984	-140	507	367	1.56	72.1	77.7
1989	5135174	61351	59397	1954	3442	5396	1.62	72.0	77.9
1990	5146248	63433	60926	2507	8332	10839	1.67	72.0	77.8
1991	5162184	64358	59581	4777	10938	15715	1.68	72.5	78.1
1992	5180493	67726	60821	6905	11462	18367	1.76	72.6	78.1
1993	5196230	67369	62809	4560	11056	15616	1.75	72.6	77.8
1994	5215460	69666	61099	8567	10251	18818	1.81	72.8	78.2
1995	5250919	69771	63127	6644	28557	35201	1.80	72.8	77.9
1996	5274755	67638	61043	6595	17133	23728	1.75	73.1	78.3
1997	5294544	67636	59925	7711	11712	19423	1.75	73.3	78.4
1998	5313620	66170	58442	7728	11032	18760	1.72	73.7	78.6

Source: Council of Europe 1999

one of the big challenges to the small and traditionally very homogeneous Danish society.”
(Hansen 1995, p.142).

The age structure of population has changed substantially. In 1950 there were only 390 thousand people aged 65 years or over (Heilig 1997). By 1998 this number had more than doubled, reaching 771 thousand. The population aged 0-14 stood at 1124 thousand in 1950 and dropped to 943 thousand in 1998. Two components contributed to the ageing of Danish population: decreasing fertility which resulted in the reduced number of people at the base of the age pyramid and rising longevity which increased the number of people at the top of the pyramid. The latter phenomenon may be illustrated by comparison of life expectancies for males and females: they were 52.9 and 56.2 respectively in 1901-1905 (Danmarks Statistik 1999). In 1998 male life expectancy equalled to 73.7 and female 78.6 (Council of Europe 1999).

The urban population in Denmark increased from 68% of the national total in 1950 to 85% in 1995 according to the official definition of urban areas (areas with over 200 inhabitants), much of the increase due to rural to urban migration flows. Post war migration patterns in Denmark underwent substantial changes, in line with changes in Europe. The special nature of the Danish urban system – dominated by Copenhagen - makes it necessary to view it as a two-tier system consisting of the Copenhagen agglomeration and, below the first tier, all other cities and towns.

From the second half of the 19th century until about 1970 Denmark witnessed a strong urbanisation with highly positive migration gains in the capital city (Illeris 1984, 1996). In the 1970s a period of counter-urbanisation took place, with population gains in small towns

and rural areas and population losses in the Copenhagen region. In the 1980s, a period of rather stable population numbers in all size classes of towns and settlements was observed.

Inside the urban areas, suburbanisation started early in the 20th century, accelerating after 1960 (Andersen 1977). However, around 1980 a flattening of patterns occurred, and a stabilisation in the population of the central commune of Copenhagen was observed.

3. METHODS USED AND DATA EMPLOYED

3.1 Geographical scale, geographical units and variables used

For the investigation of population dynamics and migration in Denmark two geographies have been used: the 275 municipalities (communes) created after the administrative reform of 1970 and the 13 counties (Amter) plus the two central communes of Copenhagen. Figure 1 shows the location of these two sets of areal units. The reform resulted in the creation of larger communes, in which towns were systematically amalgamated with their suburbs. However, the administrative reform did not reshape the capital region. The administrative division of the country was the same in 1985 as in 1998, the two years for which data were used in this report.

3.2 Digital boundaries and mapping techniques

The maps of migration variables are based on administrative boundaries of Denmark purchased from MEGRIN, the consortium of European mapping agencies. Mapping techniques used in this study have been explained fully in Rees, Durham and Kupiszewski (1996).

3.3 Variables and key indicators used

As the other case studies of internal migration and population dynamics in this series, we have used a set of common measures and techniques. In order to maintain comparability of results only minor changes in the methodology were introduced. We compare various spatial patterns between the 1980s and the 1990s employing two representative years: 1985 and 1998. Generally, migration varies considerably from year to year, and to study migration in the late 20th century, it would have been preferable to use data from an extensive time series.

Figure 1: The municipalities and counties of Denmark

København og Frederiksberg

- 1 København
- 2 Frederiksberg
- København**
- 3 Ballerup
- 4 Brøndby
- 5 Dragør
- 6 Gentofte
- 7 Gladsaxe
- 8 Glostrup
- 9 Herlev
- 10 Albertslund
- 11 Hvidovre
- 12 Høje Taastrup
- 13 Ledøje-Smørum
- 14 Lyngby-Tårnbæk
- 15 Rødovre
- 16 Søllerød
- 17 Ishøj

Fyn

- 18 Tårnby
- 19 Vallensbæk
- Frederiksberg**
- 20 Værløse
- 21 Allerød
- 22 Birkerød
- 23 Farum
- 24 Fredensborg-Humblebæk
- 25 Frederikssund
- 26 Frederiksværk
- 27 Græstede-Gilleleje
- 28 Helsingør
- 29 Hilsinge
- 30 Hillerød
- 31 Hundested
- 32 Hørsholm
- 33 Jægerspris
- 34 Karløbe
- 35 Skibby
- 36 Skævinge
- 37 Slangerup
- 38 Stenløse
- 39 Ølstykke

Roskilde

- 40 Bramsnæs
- 41 Greve
- 42 Gundsø
- 43 Hvalsø
- 44 Køge
- 45 Lejre
- 46 Ramsø
- 47 Roskilde
- 48 Skovbo
- 49 Solrød
- 50 Vallo

Vestsjælland

- 51 Bjergsted
- 52 Dianalund
- 53 Dragsholm
- 54 Fuglebjerg
- 55 Gørlev
- 56 Hashøj
- 57 Haslev
- 58 Holbæk
- 59 Hvidebæk
- 60 Høng
- 61 Jernløse
- 62 Kalundborg
- 63 Korsør
- 64 Nykøbing-Rørving
- 65 Ringsted
- 66 Skælskør
- 67 Slagelse
- 68 Sorø
- 69 Stenlille
- 70 Svinninge
- 71 Tornved
- 72 Trundholm
- 73 Tølløse

Storstrøm

- 74 Fakse
- 75 Fladså
- 76 Holeby
- 77 Holmegård
- 78 Højrby
- 79 Langebæk
- 80 Maribo
- 81 Møn
- 82 Nakskov
- 83 NykøbingFalster
- 84 Nysted
- 85 Næstved

NørreAlslev

- 86 NørreAlslev
- 87 Præsto
- 88 Ravnsborg
- 89 Rudbjerg
- 90 Rødby
- 91 Rønnede
- 92 Sakskobing
- 93 Stevs
- 94 Stubbekøbing
- 95 Suså
- 96 Sydfalster
- 97 Vordingborg

Bornholm

- 98 Allinge-Gudhjem
- 99 Hasle
- 100 Neksø
- 101 Rønne
- 102 Aakirkeby

Fyn

- 103 Assens
- 104 Bogense
- 105 Broby
- 106 Ejebjerg
- 107 Eby
- 108 Faaborg
- 109 Glamsbjerg
- 110 Gudme
- 111 Haarbø
- 112 Kerteminde
- 113 Langeskov
- 114 Marstal
- 115 Middelfart
- 116 Munketo
- 117 Nyborg
- 118 NørreAaby
- 119 Odense
- 120 Otterup

Sønderyjland

- 121 Ringe
- 122 Rudkøbing
- 123 Ryslinge
- 124 Svendborg
- 125 Sydangeland
- 126 Sønderø
- 127 Tommerup
- 128 Tranekær
- 129 Ullerslev
- 130 Visstenbjerg
- 131 Årskøbing
- 132 Ørbæk
- 133 Årslev
- 134 Aarup

Sønderyjland

- 135 Augustenborg
- 136 Bov
- 137 Bredehø
- 138 Broager
- 139 Christiansfeld
- 140 Gram
- 141 Gråsten
- 142 Haderslev
- 143 Højer
- 144 Lundtoft
- 145 Løgumkloster
- 146 Nordborg
- 147 NørreRangstrup
- 148 Rødding
- 149 Redekø
- 150 Skærbæk
- 151 Sundeved
- 152 Sydals
- 153 Sønderborg
- 154 Tinglev
- 155 Tønder
- 156 Vojens
- 157 Aabenraa

Ribe

- 158 Billund
- 159 Blibjerg
- 160 Blåvandshuk
- 161 Bramming
- 162 Brørup
- 163 Esbjerg
- 164 Fane
- 165 Grindsted
- 166 Helle
- 167 Holsted
- 168 Ribe
- 169 Varde
- 170 Vejen
- 171 Ølgod



Vejle

- 172 Brødstrup
- 173 Børkop
- 174 Egtved
- 175 Fredericia
- 176 Gedved
- 177 Giv
- 178 Hedensted
- 179 Horsens
- 180 Jelling
- 181 Juelsminde
- 182 Kolding
- 183 Lunderskov
- 184 NørreSnede
- 185 Tarring-Uldum
- 186 Vamdrup
- 187 Vejle

Ringkøbing

- 188 Avlum-Haderup
- 189 Brande
- 190 Egvad
- 191 Herning
- 192 Holmsland
- 193 Holstebro
- 194 Ikast
- 195 Lemvig
- 196 Ringkøbing
- 197 Skjern
- 198 Struer
- 199 Thyborøn-Harboør
- 200 Thyholm
- 201 Trehøje
- 202 Ulfborg-Vemb
- 203 Videbæk
- 204 Vinderup
- 205 Åskov

Århus

- 206 Ebeltoft
- 207 Galten
- 208 Gjern
- 209 Grenaa
- 210 Hadsten
- 211 Hammel
- 212 Hinnerup
- 213 Herning
- 214 Langå
- 215 Mariager
- 216 Midtjurs
- 217 Nørhald
- 218 NørreDjurs
- 219 Odder
- 220 Purhus
- 221 Randers
- 222 Rosenholm
- 223 Rougsø
- 224 Ry
- 225 Rønde
- 226 Samsø
- 227 Silkeborg
- 228 Skanderborg
- 229 Sønderhald
- 230 Thom
- 231 Århus

Viborg

- 232 Bjerringbro
- 233 Fjends
- 234 Hanstholm
- 235 Hvarsløv
- 236 Karup
- 237 Kjellerup
- 238 Morsø
- 239 Møldrup
- 240 Sallingsund
- 241 Skive
- 242 Spøttrup
- 243 Sydsø
- 244 Sundby
- 245 Thisted
- 246 Tjele
- 247 Viborg
- 248 Ålestrup
- 249 Arden
- 250 Brovst
- 251 Brønderslev
- 252 Dronninglund
- 253 Farsø
- 254 Fjerritslev

Frederikshavn

- 255 Frederikshavn
- 256 Hadsund
- 257 Hals
- 258 Hirtshals
- 259 Hjørring
- 260 Hobro
- 261 Læse
- 262 Løgstør
- 263 Løkken-Vrå
- 264 Nibe
- 265 Nørager
- 266 Pandrup
- 267 Sejflod
- 268 Sindal
- 269 Skagen
- 270 Skørping
- 271 Støvring
- 272 Sæby
- 273 Aabybro
- 274 Aalborg
- 275 Aars

194 Kommuner
(Municipalities)

VEJLE Amter
(Counties)

But that would have been very costly. The two selected years both represent a boom in the Danish economy. Illeris (1996) established that in Denmark there is a significant dependence between migration patterns and the economic cycle. Therefore the selection of two years in which economy was strong was an attempt to eliminate the impact of short term changes of the economic performance on migration pattern. The results of investigation are presented in the cartographic form, which allows for easy identification of spatial patterns. Another technique applied was estimation of origin-destination migration matrices for bands of communes characterised by values of selected variables within predefined ranges. The variables used in this study were: population size of commune, population density and unemployment level. A more detailed description of variables and indicators used for mapping purposes and for construction of bands follows. In addition two classifications of communes, according to their economic base and according to commuting patterns and urban character, were used.

3.3.1 Population and population change data

Population change for each commune was calculated based on data on population stocks for 1985 and 1998. All population stocks came from Danish population registers which are well known for the quality and accuracy of their data.

3.3.2 Migration data

Denmark, as other Scandinavian countries, has a long lasting tradition of registration of demographic events which provides information on migration for small spatial units and the detailed socio-demographic characteristics of migrants. All data used in this study come from population registers. Inflows and outflows by age, sex and commune were obtained from Danmarks Statistik for 1985 and 1998. They were used for construction of tables of flows

between various bands of communes defined by selected variables and for construction of internal in-migration, out-migration and net migration maps by communes. Also maps of in-migration, out-migration and net migration by age between regions were generated from these tables.

It should be noted that only migration between communes is taken into consideration. Since communes in Jutland tend to have larger surface areas than those on the islands, it follows that the probability for a migration over a certain distance to cross a communal border is higher in the islands than in Jutland. Thus the analysis may show a false higher mobility in the islands than in Jutland.

In the entire study, unless stated explicitly, by migration we refer always to migration within national boundaries.

3.3.3 Births and deaths

Data on births and deaths by commune in 1998 were used for construction of a so-called Webb typology, explained later. It should be noticed that births and deaths are registered according to the place of usual residence, not according to the place where the birth or death actually occurred.

3.3.4 Population density

Population density was calculated based on population data for communes in 1998 and areas of communes calculated from a digital map of Danish communes held in a GIS system. This classification allows to establish the direction of flows between bands of communes with

various predefined population densities which primarily depend on the degree of urbanisation.

3.3.5 *Size of communes*

Size class of communes was calculated based on population data for 1998. This classification will be used to examine the preferences of migrants for localities of various sizes. The following classes have been used: below 5000 inhabitants, 5000 up to 10000, 10000 up to 25000, 25000 up to 50000, 50000 up to 100000, and 100000 and over inhabitants.

3.3.6 *Classification according to the level of urbanisation and commuting patterns*

A mixed classification of communes is employed, shown in Table 2, based partially on commune size (for communes with a population of 10000 or more), and partly on commuting pattern (for communes with population below 10000).

Table 2: The classification of communes based on their size and commuting pattern

Class label	Class description
Copenhagen	Central communes of Copenhagen
Suburban communes of Copenhagen	Suburban communes of Copenhagen area (contiguous built-up area)
Other towns	Other towns with more than 10000 inhabitants (in the contiguous built-up area)
More in- than out-commuters	Other communes with more in-commuters than out-commuters
High out-commuting	Other communes where more than 50% of resident economically active population out-commute
Moderate out-commuting	Other communes where less than 50% of resident economically active population out-commute

Source: Danmarks Statistik

3.3.7 *The economic classification of communes*

The economic classification of communes was employed. The typology was based on the structure of employment by place of work in 1998. Shares in employment in the three principal sectors of the economy: services, manufacturing and construction, and agriculture were taken into account. The classification is shown in Table 3.

Table 3: The economic classification of communes based on the structure of employment by communes by place of work in 1998

Core economic activity of class	Criteria of selection according to shares of employment in three sectors of economy: services, manufacturing and construction, and agriculture
Services	More than 68% in services
Manufacturing	More than 43% in manufacturing and construction
Services and manufacturing	45-68% in services, 20-43% in manufacturing and construction, less than 12% in agriculture
Services and agriculture	45-68% in services, less than 20% in manufacturing and construction, more than 12% in agriculture
Mixed	Less than 68% in services, 20-43% in manufacturing and construction, and more than 12% in agriculture

This classification will be used to examine the flows of migrants between types of communes with specified core economic activities and to assess the attractiveness of the types to migrants.

3.3.8 Unemployment

The unemployment rate calculated as a percentage of unemployed in relation to economically active population for 1998 has been provided by Statistics Denmark. For the country as a whole the unemployment rate was 6.6 %. Each commune was assigned to one of five bands of unemployment: below 4% of economically active population, 4-6%, 6-8%, 8-10% and 10% and more of economically active population. Analysis of flows between these bands

allows for the assessment how significant the level of unemployment, or economic conditions, are for migration decisions.

4. THE PATTERN OF INTERNAL MIGRATION BETWEEN COMMUNES THROUGH THE LIFE COURSE, 1985 AND 1998

The high quality of Danish statistics allows us to analyse migration flows between communes by age. Data for 1985 and 1998 were used to examine migration in six age groups, which correspond to different stages in the life course:

0-14	the childhood ages
15-29	the adolescent and young adult ages
30-44	the labour force and family ages
45-59	the older labour force ages
60-74	the retirement ages
75 and over	the elderly ages

Migration patterns depend, both in terms of intensity (Rogers, Castro 1981) and in terms of directions (Rees, Kupiszewski 1999), in a profound way on the age of migrants. In all countries examined in the Council of Europe project (Rees, Kupiszewski 1999) it was established that there is one common feature of age specific migration patterns: inflows of young adults into large urban agglomerations. Other age groups have not shown such uniform behaviour. Their migration preferences differ from country to country, depending on whether the country is undergoing urbanisation or counterurbanisation, and on the level of economic and social development.

4.1 In-migration patterns

4.1.1 Total in-migration

Between 1985 and 1998 the internal migration intensity dropped slightly from 66‰ of the population to 62‰. The pattern in 1998 was somewhat modified in comparison to this of 1985. In 1985 the highest level of in-migration, exceeding 75‰ of the mid-year population,

was observed in 106 communes (Figure 2). Geographically they are located in suburban rings around Copenhagen and a few major provincial towns (Odense, Aarhus, Aalborg). On the other hand, the central communes of Copenhagen, Odense and Aalborg as well as some communes in Northern Jutland and on remote islands had low in-migration, below 50%. But this may at least partly be explained by the large surface areas of these communes.

The number of high in-migration communes reduced to 47 in 1998 (Figure 3). They were mostly located on Zealand, including the central commune of Copenhagen – but not the suburban rings - and on Lolland. Odense, Aalborg and North Jutland communes remained low in-migration areas.

Altogether, the geographical differences in attraction are modest and, as mentioned, to some degree false. The most interesting change between 1985 and 1998 is the increased attraction of the central commune of Copenhagen and the decreased attractions of its suburbs (to be discussed later).

4.1.2 In-migration in childhood, family and older labour force ages

Migrational mobility in family ages generally remained unchanged or was slightly reduced between 1985 and 1998, except in the 30-34 bracket where it increased from 80 to 88 %. In-migration patterns roughly speaking followed the overall pattern of in-migration.

4.1.3 In-migration in retirement and elderly ages

The intensity of retirement migration in both years was low, in few communes exceeding 25 %. The pattern in 1985 (Figure 2) was similar to that of family in-migration and was most intensive in the outer ring of the Copenhagen region. In 1998 the spatial pattern resembles to some extent that of 1985 – but the receiving area for the 60-74 age class has expanded on

**Figure 2:
In-migration rates by municipalities
in Denmark, 1985**

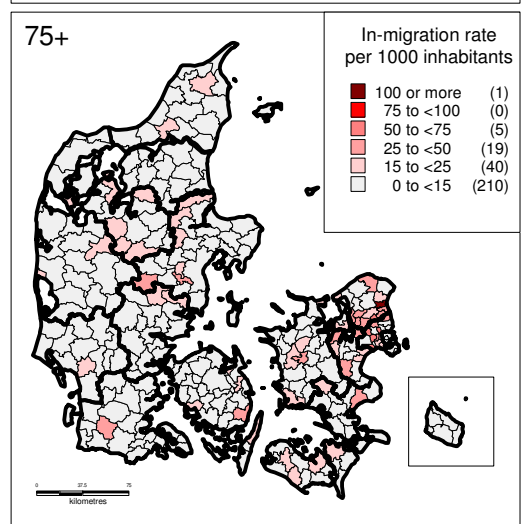
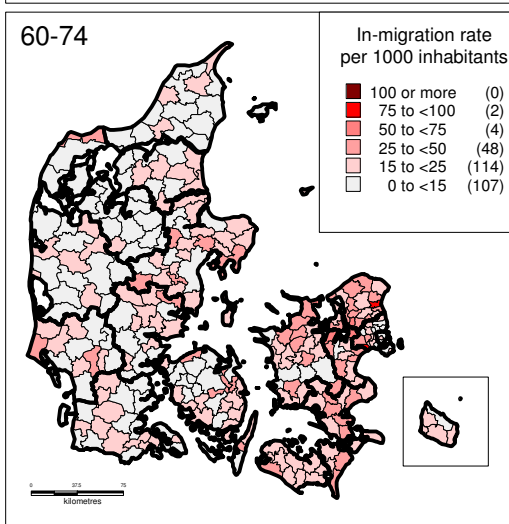
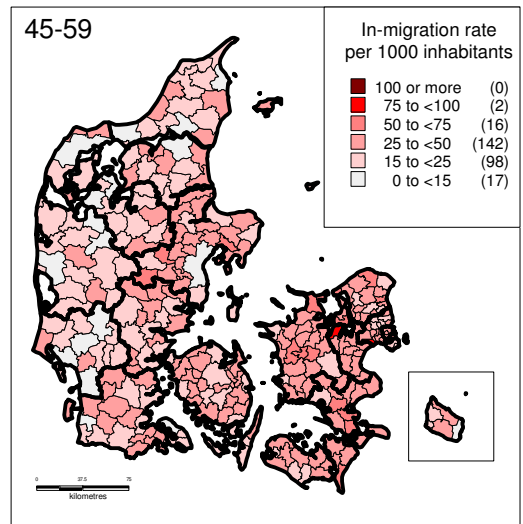
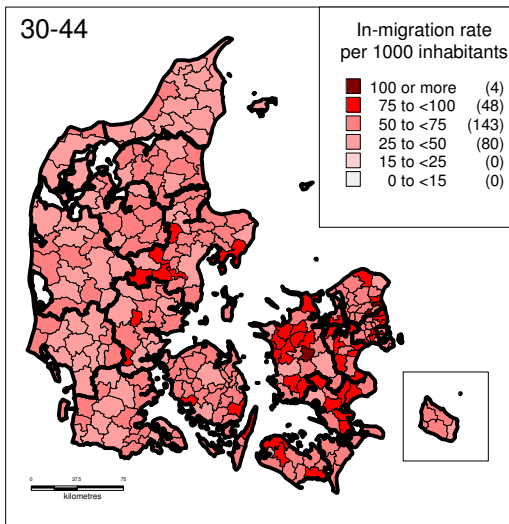
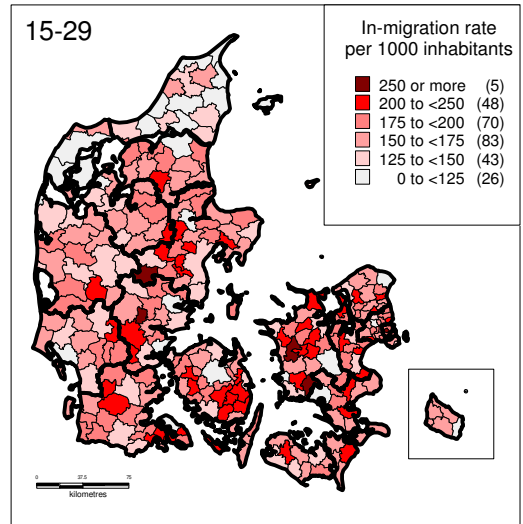
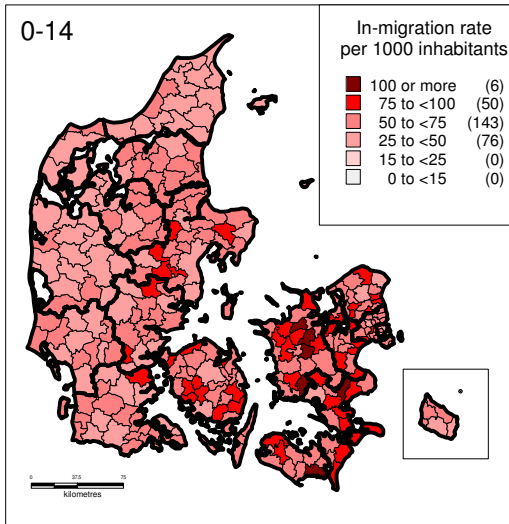
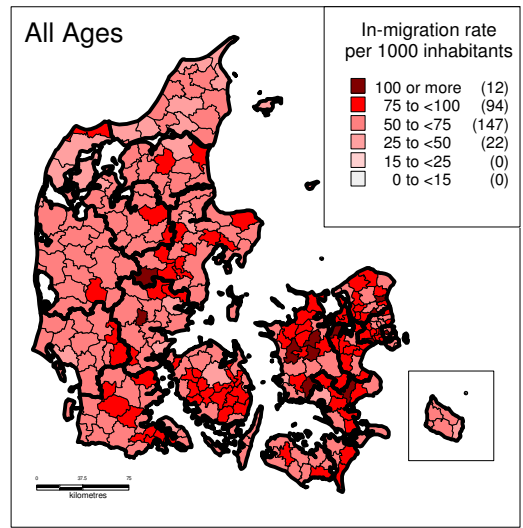
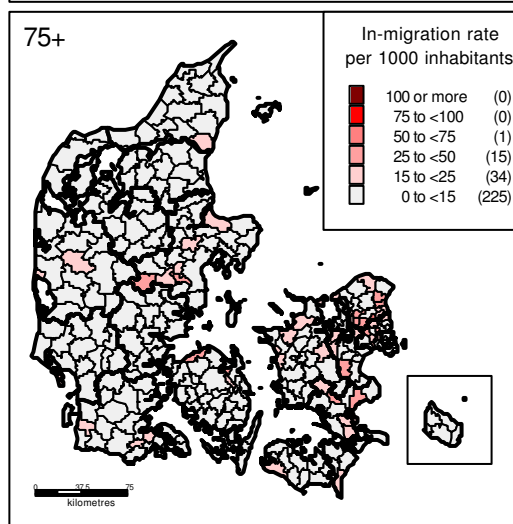
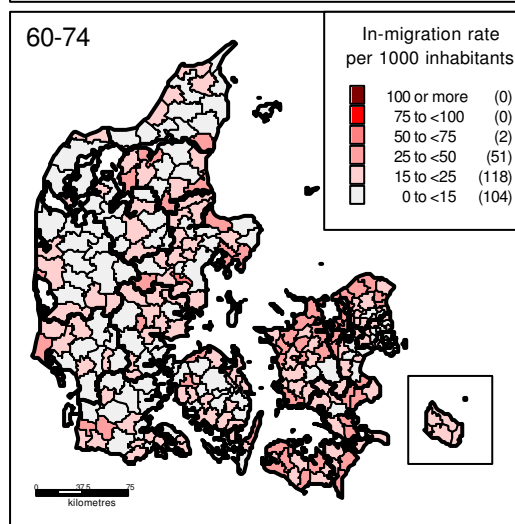
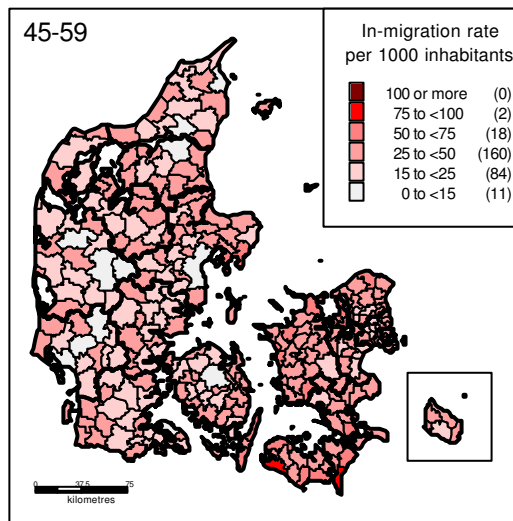
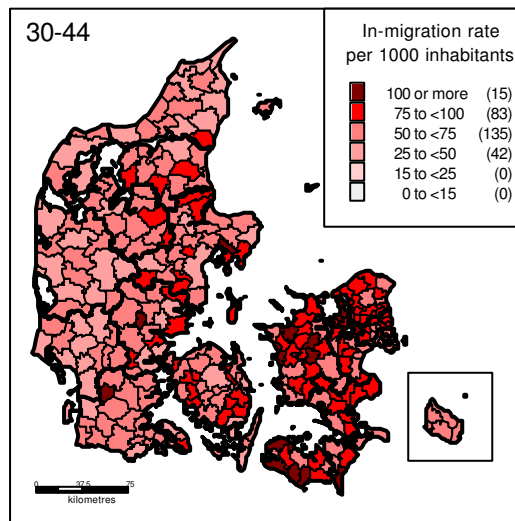
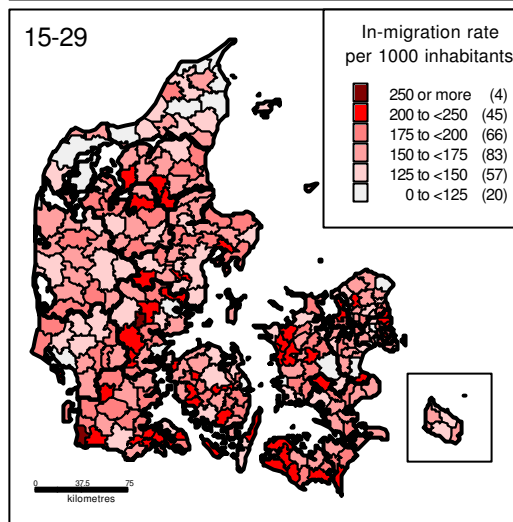
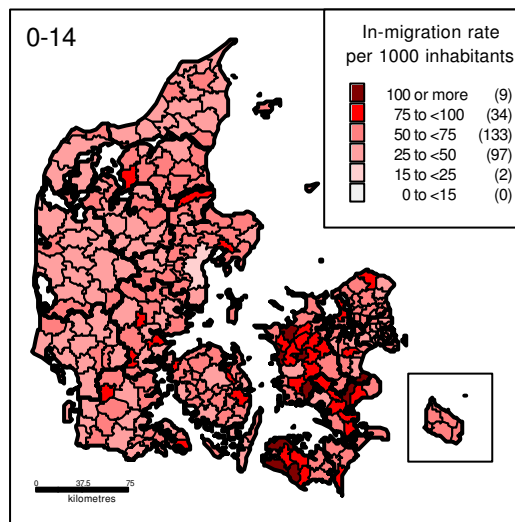
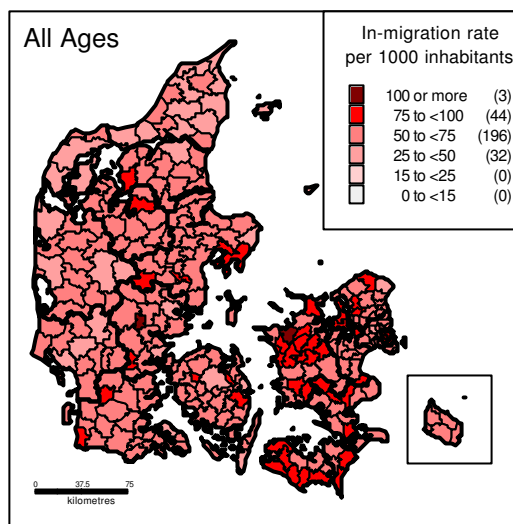


Figure 3:
In-migration rates by municipalities
in Denmark, 1998



Zealand and Lolland-Falster.

4.1.4 In-migration in the adolescent and young adult ages

Young adults migrate frequently, as already mentioned. Observe that in the relevant maps for ages 15-29, a more extensive range of classes is used than in the other age group maps. It should be mentioned that in Denmark, it is questionable whether the 15-29 years bracket is the optimal way to delimit this age group. Close inspection of the data reveal that the migration behaviour of the 25-29 class is more similar to that of the 30-34 bracket, especially in 1985. But at least, the 15-24 age group presents a pattern of migration different from those of the family ages or the elderly.

Migration mobility decreased substantially in the 15-19 years bracket, from 128 ‰ in 1985 to 102 ‰ in 1998. This decrease may be explained by the increasing number of young people who get a secondary education, usually near their home. In the 20-29 years bracket (the age of tertiary education, often far away), mobility on the other hand increased from 178 ‰ to 186 ‰. For the reason mentioned, Danish young have specific migration patterns, only partly reflected in Figure 2 and Figure 3: they primarily in-migrate to the central communes of the Copenhagen region. However, there are also high in-migration communes, with rates of over 200 in-migrants per 1000 inhabitants, spread all over the country. Low in-migration is characteristic of medium-size towns and cities and of rural communes of North Jutland. The geography of in-migration between 1985 and 1998 remains largely unchanged.

4.2 Out-migration patterns

4.2.1 Total out-migration

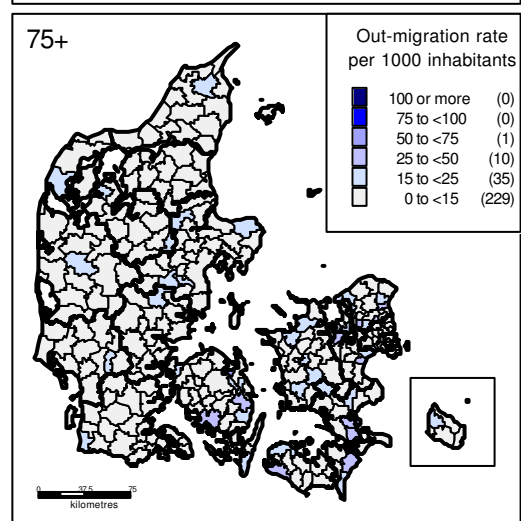
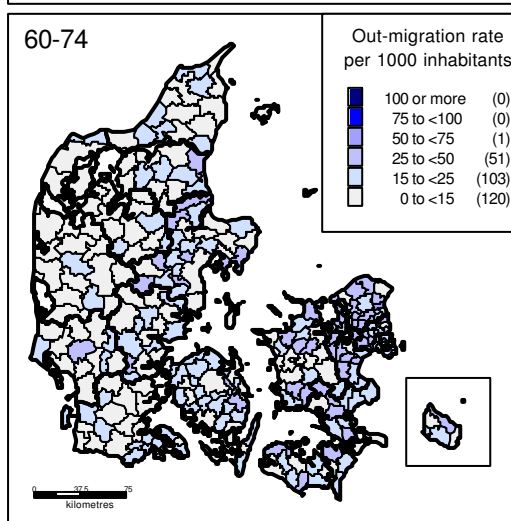
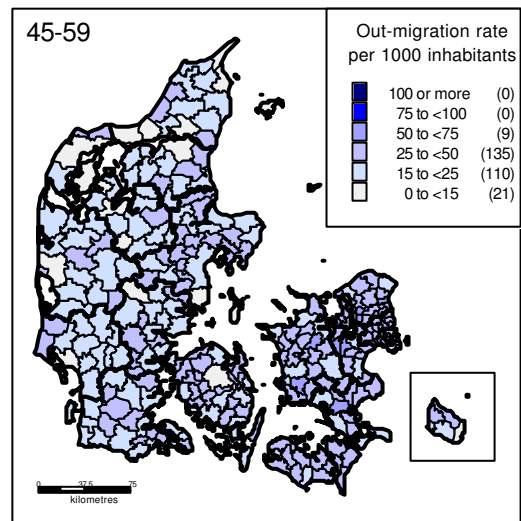
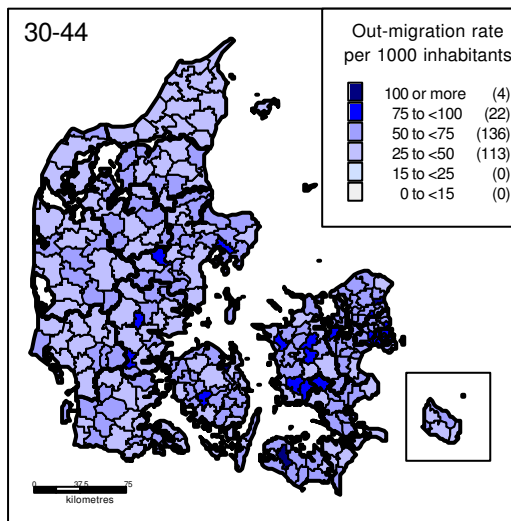
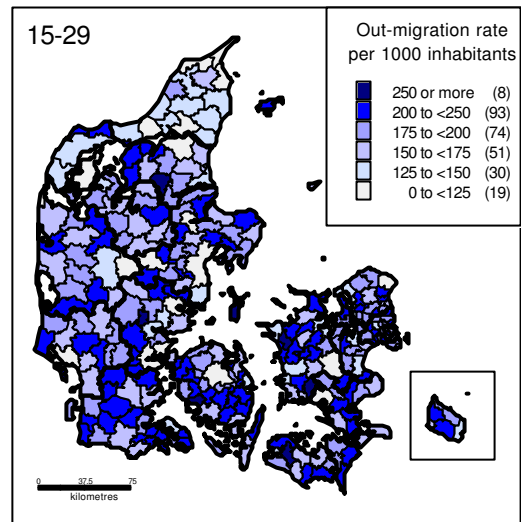
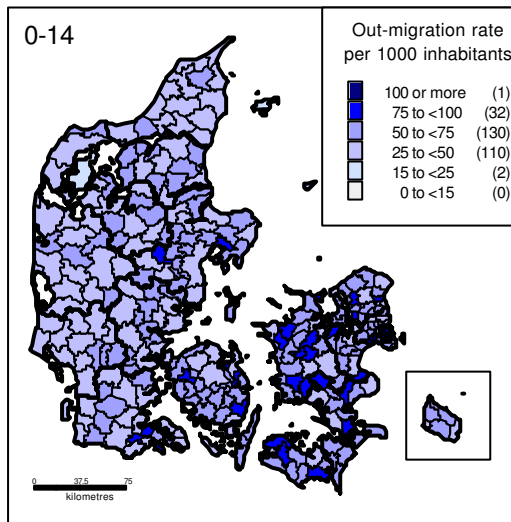
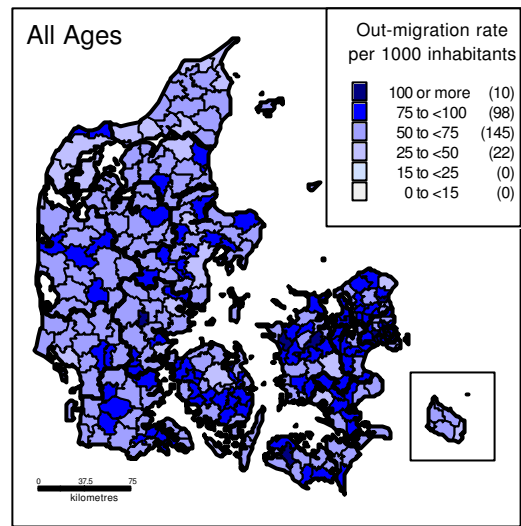
The number of communes with out-migration rates exceeding 75‰ dropped from 108 in 1985 to 42 in 1998. The geographic distribution of communes characterised by high and low

levels of out-migration (Figure 4 and Figure 5) is remarkably similar to that of high and low levels of in-migration. In general high in-migration communes tend to have high out-migration and communes with low in-migration tend to have low out-migration. High mobility may partly be explained by small surface areas, which increase the probability that a migration over a certain distance crosses a communal boundary. However, it may also be due to special characteristics of the commune. For instance, within the commune may be located educational institutions to which many persons migrate, stay for a limited time, and move away again. Generally, it may be stated that in a period of slow population increase and modest construction of new houses, the existing housing stock tends to make the migration pattern a zero-sum game: whenever somebody moves into a dwelling, it was probably recently vacated by a similar number of persons.

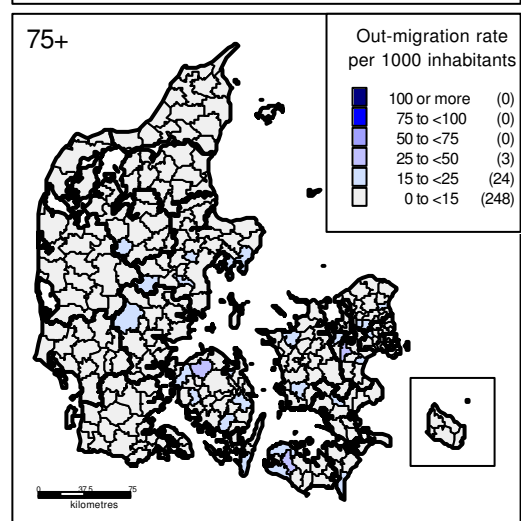
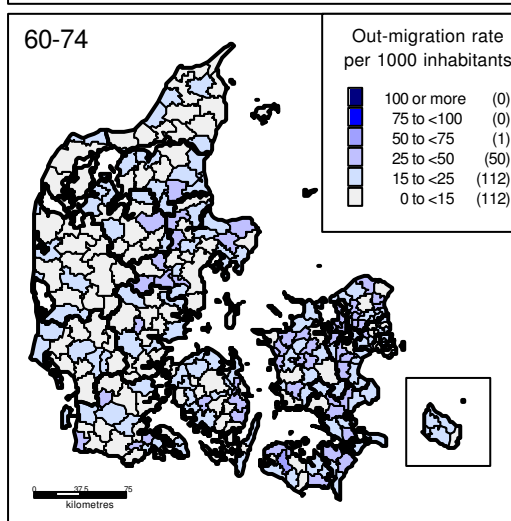
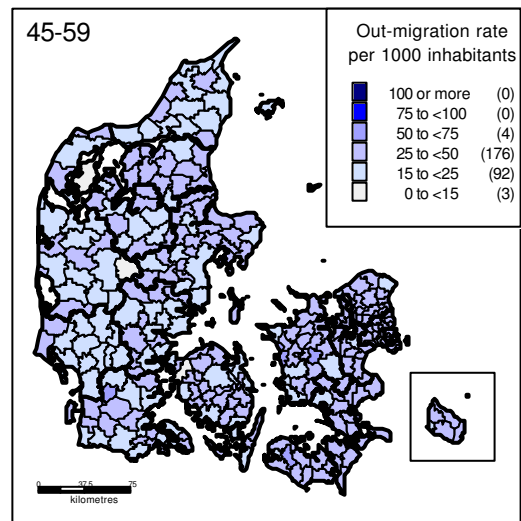
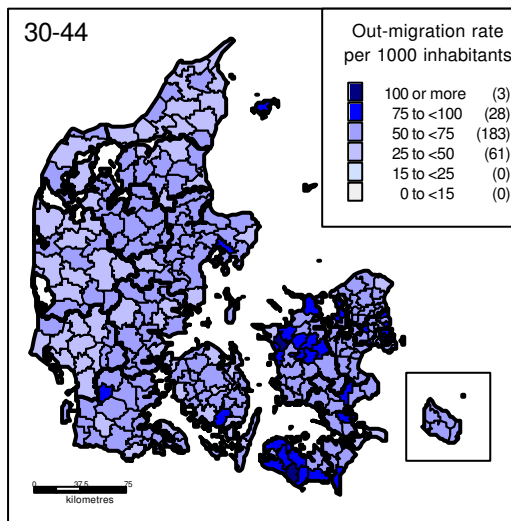
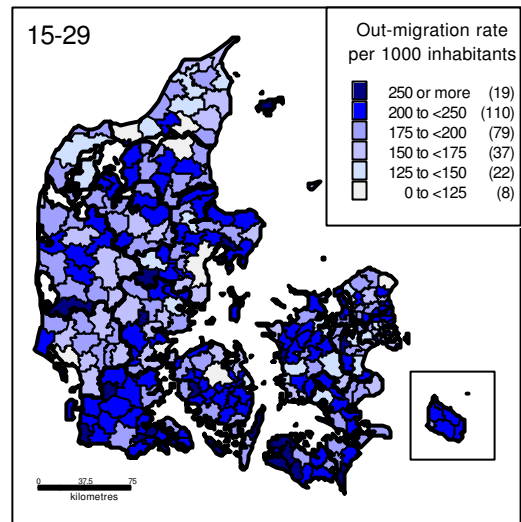
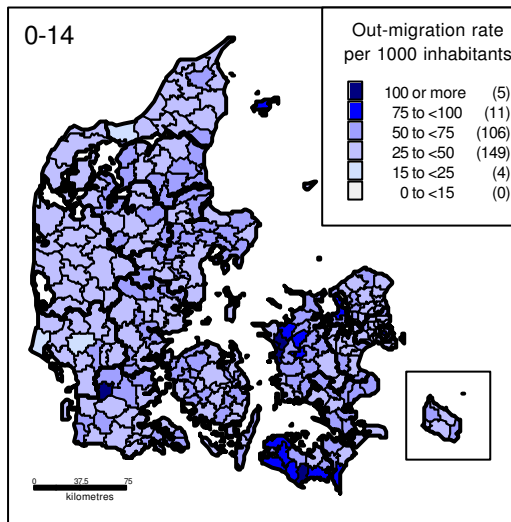
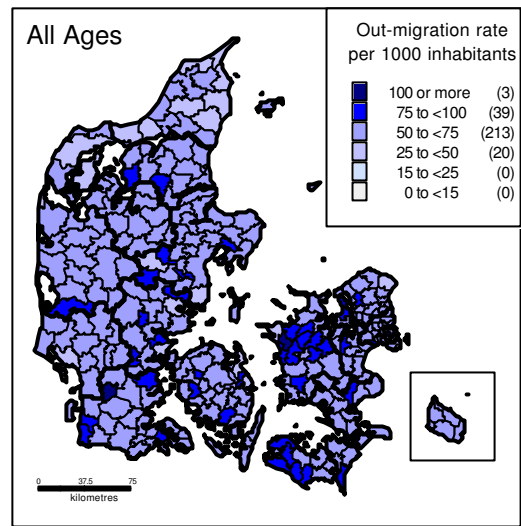
4.2.2 Out-migration in family and older labour force age groups

In Denmark in 1985 the highest out-migration rates for the 30-44 age group were seen in the city of Copenhagen, Frederiksberg, and the Copenhagen suburbs, above all western ones, in the rest of Zealand, around Odense, Aarhus and on Lolland (Figure 4). It was therefore very similar to the pattern of in-migration, with one significant difference: out-migration from Copenhagen and its suburbs exceeded in-migration to the city. The pattern in 1998 (Figure 5) for the same age group is very similar, but the migration intensity increased; the number of communes having less than 50 emigrants per 1000 population decreased from 113 in 1985 to 61 in 1998. Simultaneously the number of communes with higher intensity rates increased.

**Figure 4:
Out-migration rates by municipalities
in Denmark, 1985**



**Figure 5:
Out-migration rates by municipalities
in Denmark, 1998**



This trend of increased mobility in 30-44 years age group goes against the general trend of decline in mobility of entire population. The age group 45-59 is much less mobile than the age group 30-44, but the geographic pattern remains similar.

Children (0-14 years) show a pattern of migration very similar to that of adults. However, in 1985 (Figure 4) they demonstrate a sharper pattern of outflows from the Copenhagen agglomeration and from communes surrounding the largest towns. In 1998 these features are less evident (Figure 5) and more communes have out-migration rates not exceeding 50 persons per 1000 inhabitants.

4.2.3 Out-migration in retirement and elderly ages

In the retirement ages in 1985 higher out-migration intensities (translating into 25–50 out-migrants per 1000 inhabitants) are seen in the outer ring of the Copenhagen region (Figure 4). In the rest of the country, communes with higher out-migration do not form any specific pattern and are scattered all over the country. The 1998 pattern (Figure 5) is similar. In the oldest ages (75+) the intensity of migration is low, only sporadically exceeding 25 persons per 1000.

4.2.4 Out-migration in the adolescent and young adult ages

The highest out-migration in 1985 (Figure 4) occurred around large cities and in much of rural Denmark, especially in the south of Denmark, including islands. Large cities and northern Jutland show a low level of out-migration. The 1998 pattern (Figure 5) was quite similar.

4.3 Net migration patterns

In- and out-migration do not inform us about the impact of migration on population redistribution, which depends on the combined outcome of both. In this section an attempt will be made to assess the impact of migration on concentration and deconcentration processes occurring in Denmark in the 1980s and the 1990s.

4.3.1 Total net migration

The remarkable similarity observed in the patterns of in- and out-migration does not allow to make immediate statements on the gaining and losing areas. Only the analysis of net migration rates allows for identification of geographical patterns of migration-induced concentration and deconcentration. Despite high in- and out-migration rates, the net migration rates were modest. In 1985 there were 134 communes with positive net migration and 141 communes with negative net migration (Figure 6). Most of communes losing population through migration were located in Western and Northern Jutland, Bornholm and Lolland and on remote islands. Also the central commune of Copenhagen and the inner ring of suburbs (especially to the West) lost population. This is in stark contrast to relatively strong gains in the rest of Zealand. Contrasting with the migration losses of the capital, regional city centres, as for example Aarhus and Odense were gainers, as were their hinterlands. That is a clear pattern of concentration in regional centres and the surrounding communes, and in the outer ring of the Copenhagen region.

In 1998 the proportions of communes with positive and negative migration was similar to those of 1985 with slight prevalence of the former. The 1998 pattern of net migration differs in three aspects (Figure 7): the city of Copenhagen had a positive net migration, as had a number of communes in the inner suburban ring of the capital. Regional centres of Odense

Figure 6:
Net migration rates by municipalities
in Denmark, 1985

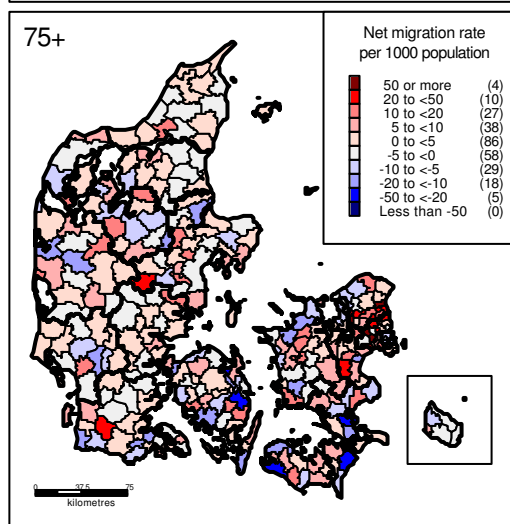
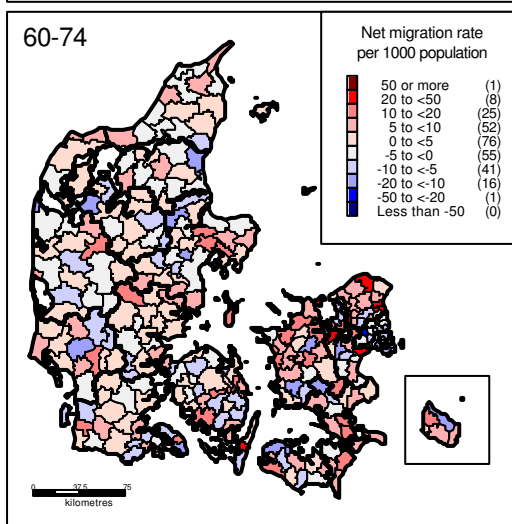
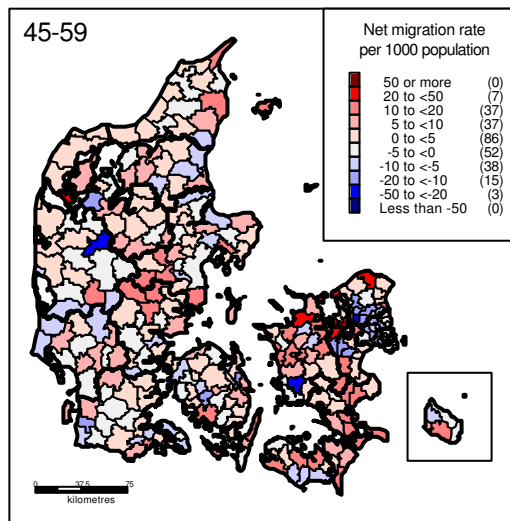
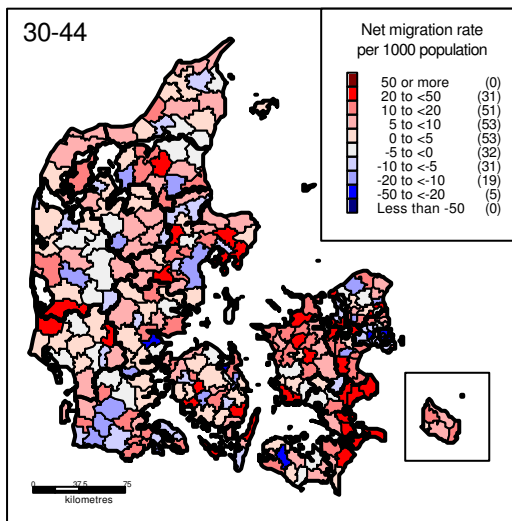
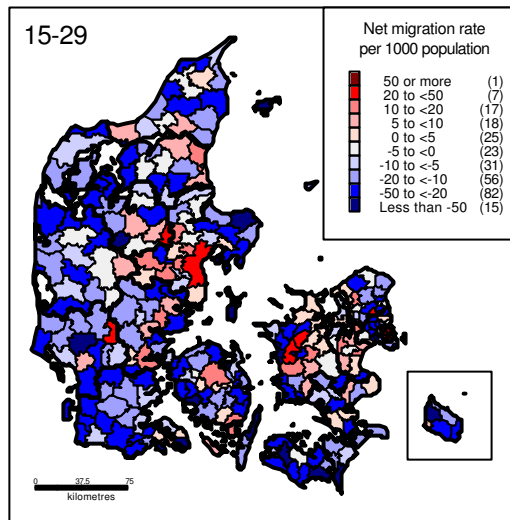
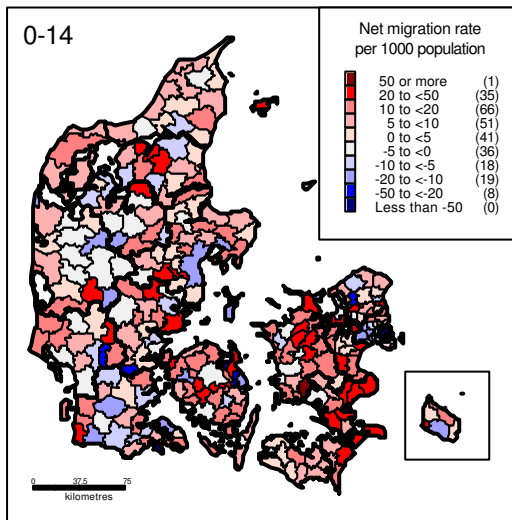
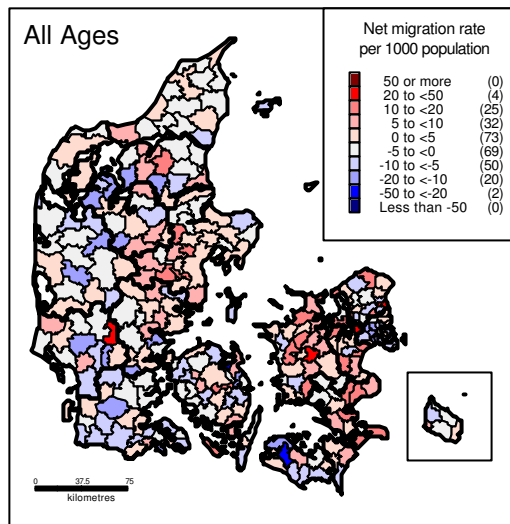
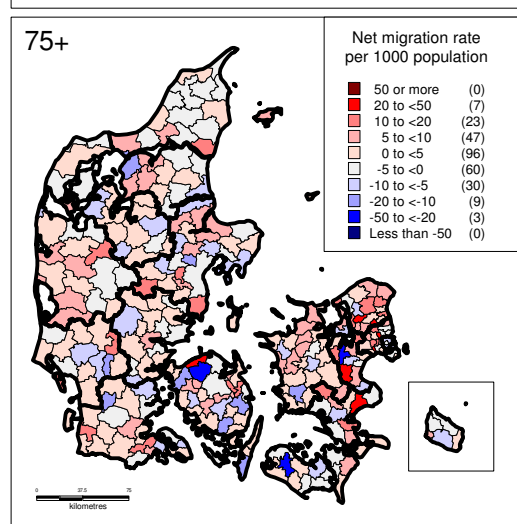
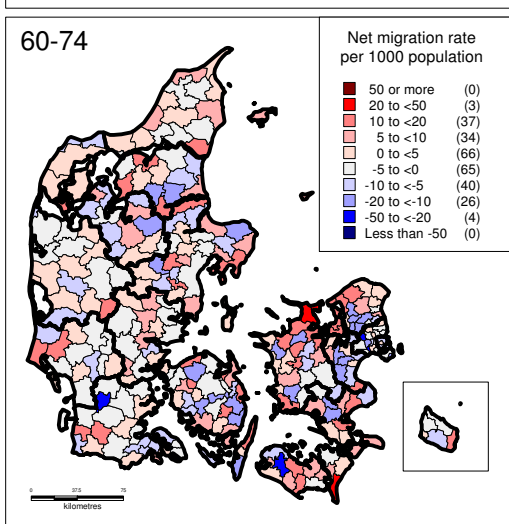
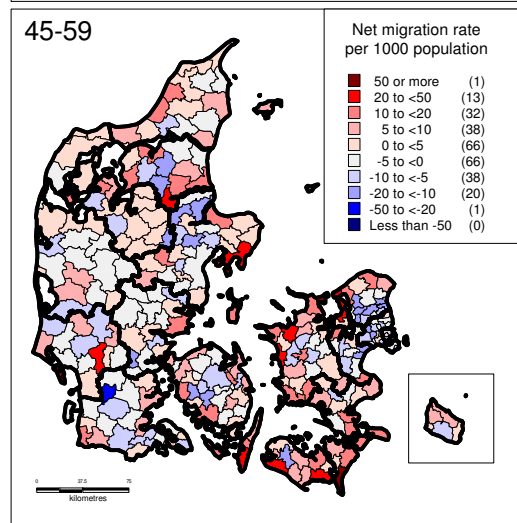
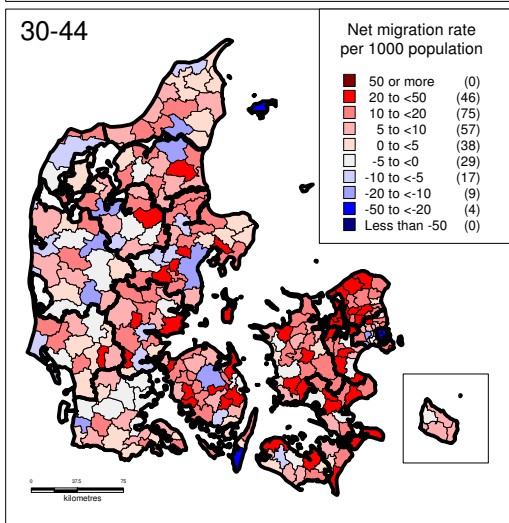
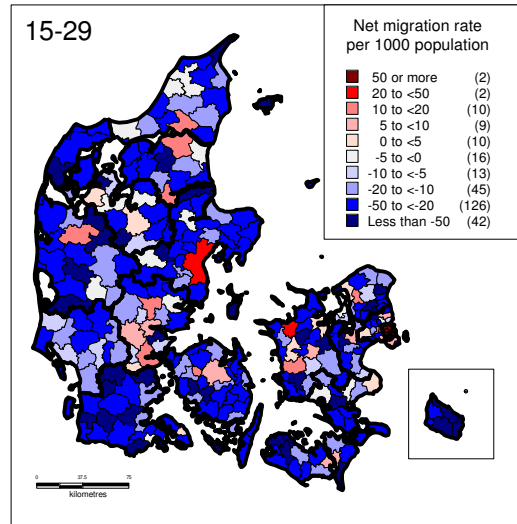
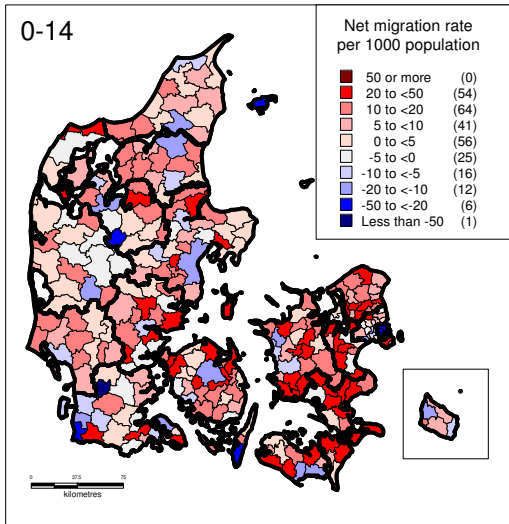
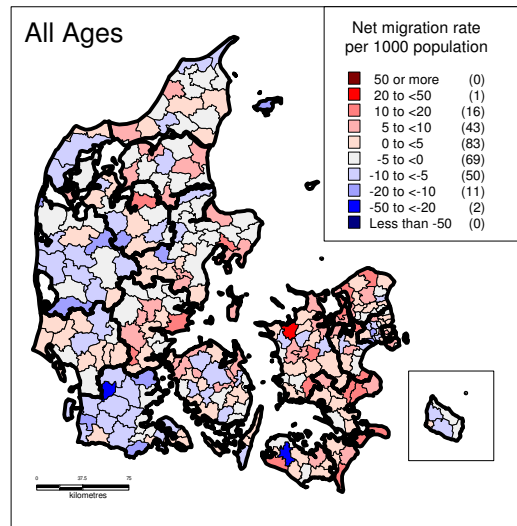


Figure 7:
Net migration rates by municipalities
in Denmark, 1998



and Aarhus turned to negative net migration and the negative net migration in Aalborg increased. The other significant change was the increased negative net migration in Western and Southern Jutland. If these changes are long lasting they will result in a significant turnaround in the Danish migration system of the 1970-1995 period.

4.3.2 Net migration in family and older labour force age groups

In 1985, in the Copenhagen agglomeration, both in the city centre and suburban ring along the Copenhagen–Roskilde axis, and in large cities, such as Odense, Aarhus, Aalborg, in- and out-migration translated (Figure 6) into a pattern of negative net migration in the 0-14 and 30-44 age groups in some rural areas, especially in western Jutland. The vast majority of Zealand, Fyn and eastern Jutland gained population through migration in this age group. In 1998 the mosaic of gaining and losing communes (Figure 7) is very similar to the pattern observed in 1985, except that most of the suburban ring of Copenhagen had turned positive.

The pattern of gains and losses in the 45-59 age group does not differ significantly from migration patterns of 30-44 years old. However, it should be mentioned that between 1985 and 1998 there was a some increase in the number of communes losing population and a decrease in the number of those gaining.

The patterns observed could be in short summarised as periurbanisation in the Copenhagen region and around other large towns, combined with moderate outflow from rural areas.

4.3.3 Net migration in retirement and elderly ages

In absolute numbers, the net migration flows in this age bracket are very small. In 1985 an outflow of elderly population from the centre of Copenhagen and its suburban communes was a dominant feature of the migration system (Figure 6). The area losing population had expanded in 1998 (Figure 7). The largest cities in general lose population, while smaller towns and rural communes are either losers or gainers. In the eldest age group preference is given to suburban communes of Copenhagen and, traces of periurbanisation around other cities is visible, denoting preferences given to locations linking both good accessibility to higher level amenities and services and good environmental conditions.

4.3.4 Net migration in the adolescent and young adult ages

Young people differ in their migration patterns from people in all other age groups (Rees, Kupiszewski 1999). The predominant characteristic of migration of this age group is a very strong concentration in urban centres. Denmark is no exception. In 1985 (Figure 6) Copenhagen and Frederiksberg had very high migration gains. These gains did not extend to suburban communes of the Copenhagen agglomeration, but existed in communes of central Zealand. Aarhus, Odense and Aalborg constitute other strong poles of attraction, together with few nearby communes, as do the medium-sized towns of Kolding, Vejle, Horsens, Sønderborg and Svendborg. Most rural communes, small towns, and the suburbs of Copenhagen, on the other hand, had negative net migration. In 1998 the process of concentration of young people sharpened: apart from Copenhagen and Frederiksberg, Aarhus, Roskilde, Odense, Aalborg, Kolding, Vejle and Horsens, only a very few communes had positive net migration, 33 in total. Communes with negative net migration, mostly between 20 and 50 persons per thousand, are spread all over the country.

This increased net migration of young people to the central parts of the largest cities constitutes the main component leading to increased concentration of population in 1998, compared to 1985. A closer inspection of the data allows us to point out that the changes mainly happened in the 20-24 years bracket, where the central communes of Copenhagen, Aarhus, Odense and Aalborg had much bigger migration gains in 1998 than in 1985, while the Copenhagen suburbs, rural communes and small towns had much bigger losses. In the 25-29 age bracket, the central communes of Copenhagen also had increased gains, while the communes of Aarhus, Odense and Aalborg – which include the contiguous suburbs – had increased losses. These observations may be interpreted as follows. The sharp increase in university and other higher educational places attracted an increasing number of young people to the large cities where these institutions are located. Possibly an increasing number of persons in the 25-29 bracket also preferred to stay in the inner city of Copenhagen (“gentrification”) rather than moving out. On the other hand, when Aarhus, Odense and Aalborg showed strong negative net migration already in the 25-29 years bracket, it may be due to the relatively small labour markets of these cities, compared to the size of their educational institutions. Many young people have to leave them immediately after finishing their education, in order to find a job.

5. POPULATION CHANGE BY COMMUNE 1985-1998

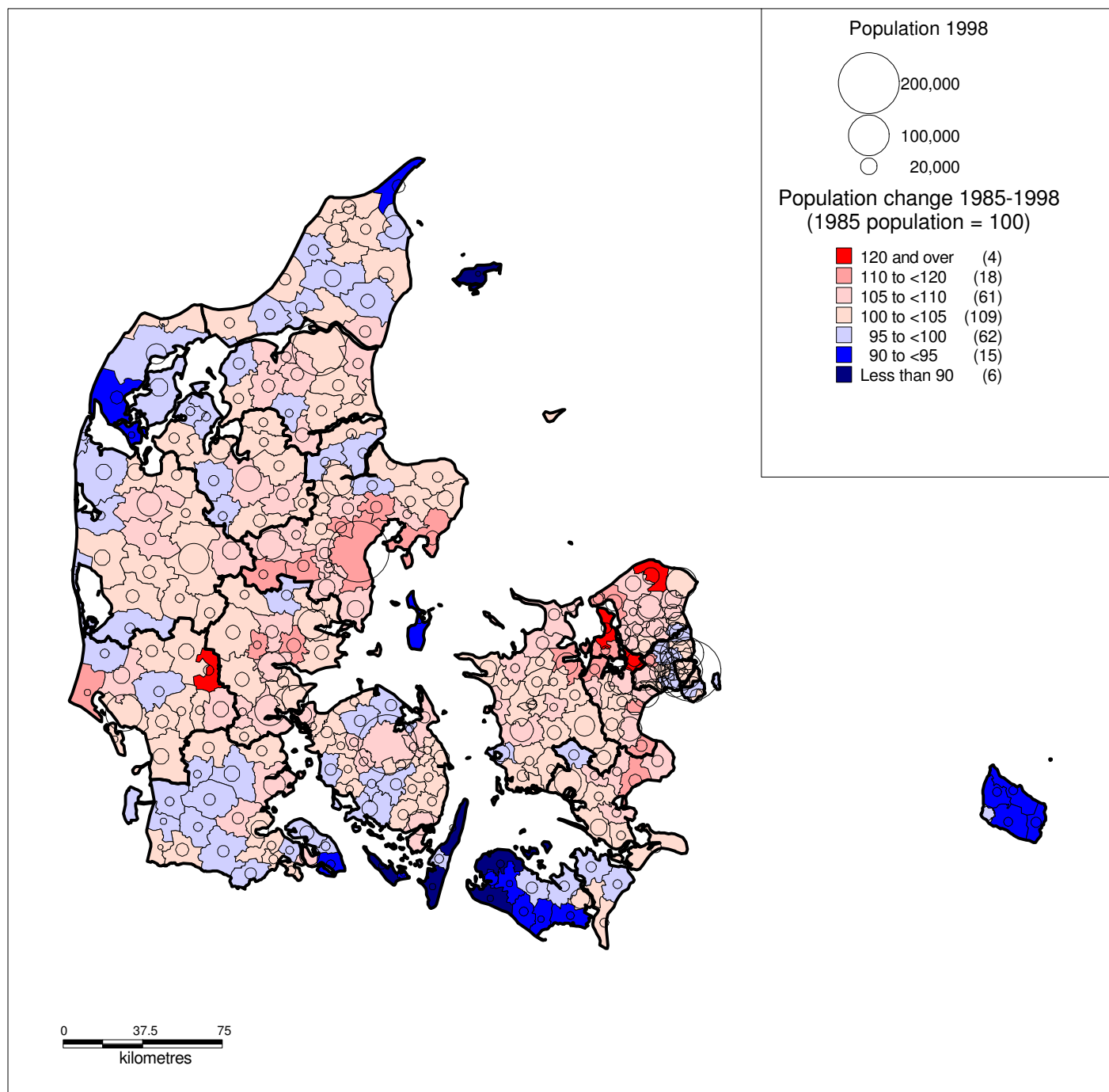
5.1 Population change in Denmark by communes 1985-1998

Figure 8 shows the population change by communes in Denmark between 1985 and 1998. Changes were small, compared to pre-1970 trends: only 43 communes had grown by more than 10 % or diminished by more than 5 % over 13 years. Population decline can be seen in less than a third of all communes. All the largest cities: Copenhagen, Aarhus, Odense, Aalborg and Esbjerg, increased their populations. There are interesting processes going on within the city of Copenhagen, where the city centre (Copenhagen og Frederiksberg and two coastal communes immediately north from it) noted moderate growth, but are surrounded by a ring of urban and suburban communes which lost population. Further away, between 15 and 25 kilometres from the city centre strong growth can be observed, in some cases exceeding 20%. Growth of 5-10 % is observed around Aarhus and in some medium-sized towns, while rural communes and small towns in most of Denmark show modest growth.

Communes with declining population can be seen in “remote” areas: islands of Bornholm, Lolland, Langeland, Ærø , Samsø, Læsø and a number of others, and in Northwestern and southern Jutland.

This picture allows us to make some conclusions: a weak process of population concentration is apparent in Denmark. On this process overlaps periurbanisation in Copenhagen region, which is a driving force behind the increase of population in major parts of Zealand. Some other large cities grow.

Figure 8: Population change in Denmark by communes 1985-1998



5.2 The demographic sources of population change

John Webb (1963) invented a simple classification of mechanisms behind population change, a full explanation of which is in Kupiszewski, Durham and Rees(1996). The classification presents the results of interplay of natural increase and mobility in each commune and allows for an immediate identification of the direction of population change, sign of net migration and natural growth and the leading force behind the population change. Definitions of each class are shown in Table 4 and the communes belonging to the classes in 1998 are shown in Figure 9.

Table 4: Types of population growth in Denmark in 1998

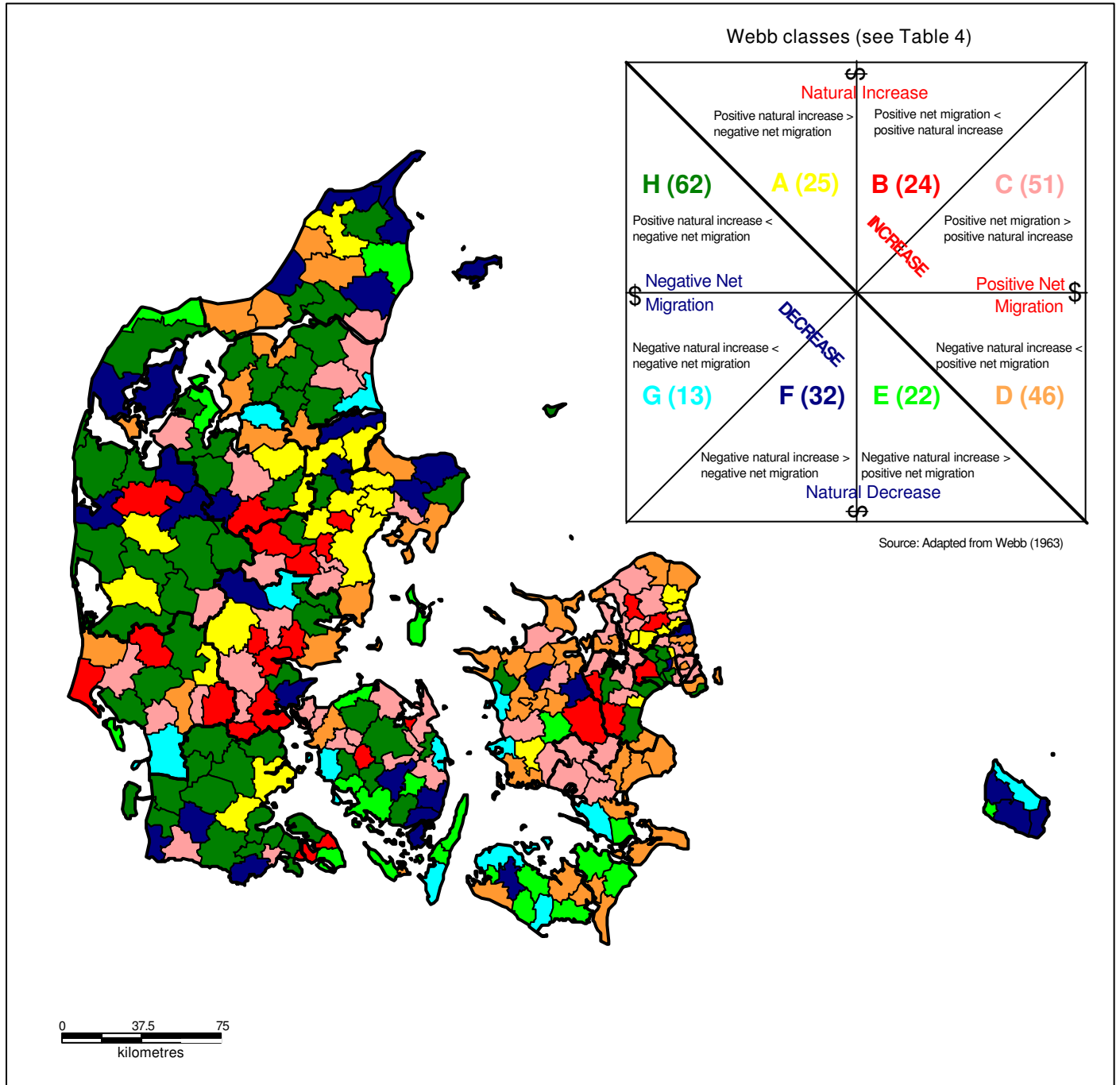
Description of type of growth	Class name	Population change	Number of communes
Positive natural increase exceeds negative net migration	A	Positive	25
Positive net migration is smaller than positive natural increase	B	Positive	24
Positive net migration exceeds positive natural increase	C	Positive	51
Negative natural increase is smaller than positive net migration	D	Positive	46
Negative natural increase exceeds positive net migration	E	Negative	22
Negative natural increase exceeds negative net migration	F	Negative	32
Negative natural increase is smaller than negative net migration	G	Negative	13
Positive natural increase is smaller than negative net migration	H	Negative	62

Source: Webb 1963 and computation from the data provided by the Danmarks Statistik.

Note: to keep the description of classes short a simplification has been made. Whenever we refer to relations between variables with different signs we refer to relations between their absolute values.

There are 25 communes where the natural increase is positive and exceeds negative net migration (class A). Most of these communes are located in Jutland, where they form a small cluster in and north and west of Aarhus. Communes where positive net migration offset negative natural growth (type D) are rural or small towns and are scattered all over the country ; most of them lie on Zealand.

Figure 9: Webb classification of municipalities in Denmark, 1998



In a number of communes both natural increase and net migration are positive, providing a sound demographic growth (types B and C). In 24 of them positive net migration is smaller than positive natural increase (type B). Most of them are located in central Jutland, some of them are medium-sized towns and others rural. In 51 units positive net migration exceeds positive natural increase (type C). These communes frequently occur in most of the country and in all size-classes.

Class E, to which belong units where negative natural increase exceeds positive net migration are mostly rural communes and small towns located on islands in southern Denmark. Units where the negative net migration exceeds positive natural increase (class H) are the most numerous in all size-classes and cover most of Jutland, especially western and southern, as well as central Fyn. They are infrequent in Eastern Denmark except among Western suburbs of Copenhagen.

Communes in which both components, net migration and natural growth are negative (type F and G), are worrying from demographic point of view. The former type F, where negative natural increase exceeds negative net migration, is spread all over the country and creates clusters on Bornholm. These communes are almost all rural. The few communes of type G (negative natural increase is smaller than negative net migration) do not cluster in any way; they are rural communes or small towns.

In 1998 there were 146 communes in which combined natural change and net internal migration resulted in increase of population and 129 resulted in decrease of population. The former communes concentrate on Zealand and in central-eastern Jutland, the latter mostly in western, southern and northern Jutland, Fyn and Bornholm and on small islands. There is,

therefore, some degree of spatial polarisation of more prosperous, in demographic terms, central-east of the country and less prosperous remaining part.

While the migration component has already been discussed, it should be noticed that the natural increase component is positive in the Copenhagen region, Northern Fyn, and in Jutland, but negative in the rest of the islands.

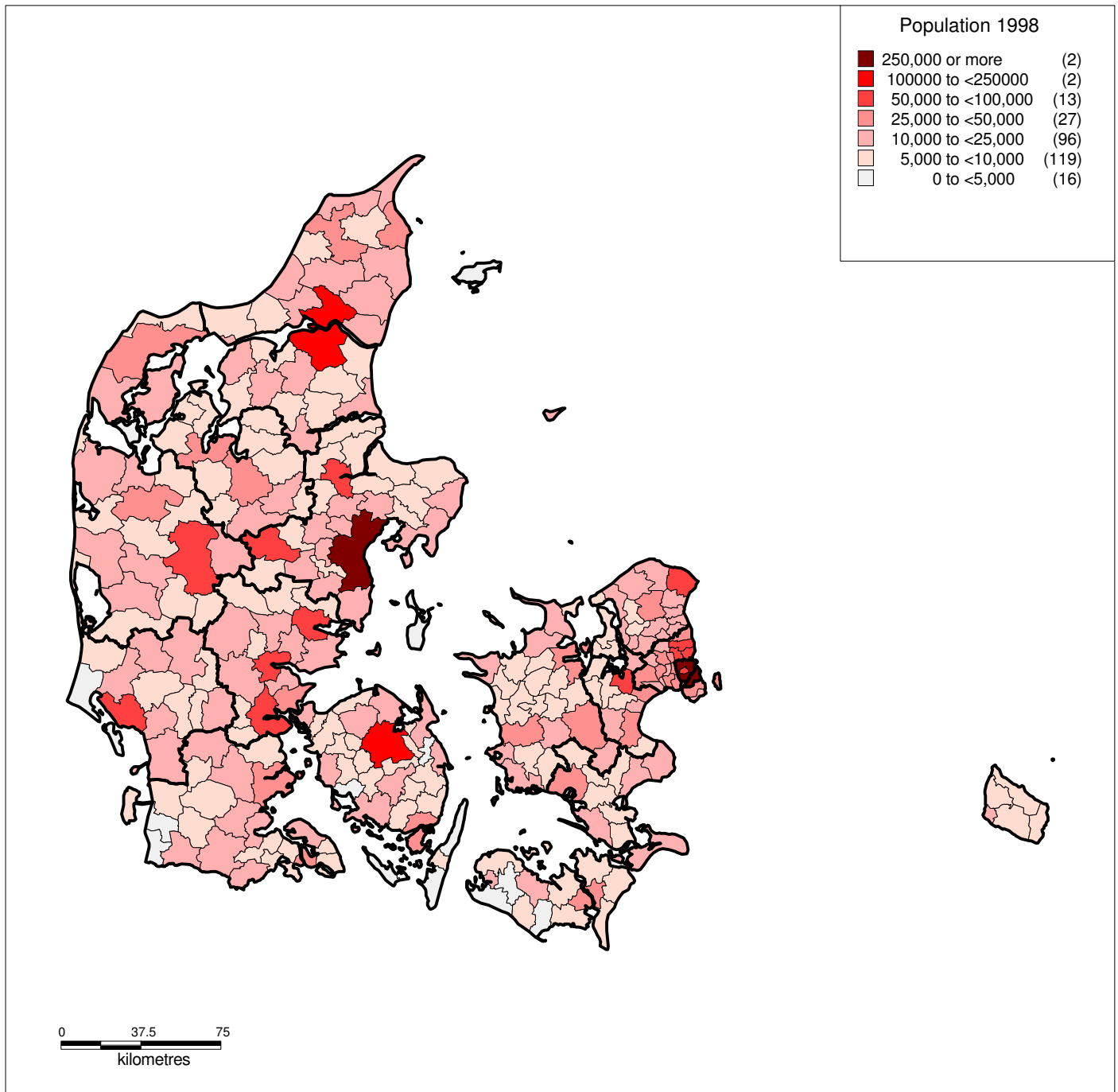
6. RELATIONSHIP OF INTERNAL MIGRATION TO THE URBAN SYSTEM

6.1 Relationship of migration to settlement size

The size of communes may be a rough indicator of their type: we may distinguish between urban communes (generally over 25,000 inhabitants) and rural communes (generally under 10,000 inhabitants). Communes between 10,000 and 25,000 inhabitants are mixed. It should be noted that only 16 communes have fewer than 5000 inhabitants.

The distribution of population in Denmark is uneven (Figure 10). The settlement system is dominated by the urban agglomeration of Copenhagen. The rest of the country is covered with a fairly regular pattern of towns, which is less dense in Western Jutland. Most larger provincial urban centres are found in Eastern Jutland. The migration gains and losses of commune size bands and the effectiveness of migration between them is shown in Table 5. One should keep in mind that the top class consists of four communes: Copenhagen, Aarhus, Odense and Aalborg. In 1998, communes in this size band, bar Copenhagen, had negative net migration losses to the rest of the country. This band lost migrants to all other bands except for the band of smallest communes with populations below 5000 inhabitants. Medium size communes with populations of 50000 up to 100000 are the most successful, gaining population from all other bands. The 5000 to 10000 band also gains population from all bands with exception of 50000 to 100000 inhabitants band. Small communes, with below 5000 inhabitants, lose population to all other bands. The overall pattern of population relocations between bands is quite complicated, showing a mixture of flows up and down the hierarchy: both the largest cities, smallest communes and medium size communes within the range of 10000 to 50000 lose population by migration. Gainers are medium size cities within 50000 to 100000 inhabitants and small communes with population from 5000 to 10000 inhabitants. This unclear pattern is partly due to the small net migration flows and partly due

Figure 10: Municipalities in Denmark by size of population, 1998



to the short period of only one year. The effectiveness of migration (net migration divided by gross migration) between bands is extremely low, or in other words: Net migration flows are very modest.

Table 5: Net migration and migration effectiveness ratios by size band, Denmark, 1998

Origin size of commune band	Destination size of commune band					
	< 5000	5000-< 10000	10000-< 25000	25000-< 50000	50000-< 100000	100000+
Less than 5000		2	1	1	2	1
5000 - <10000	-27		0	1	0	1
10000 - <25000	-27	154		0	1	1
25000 - <50000	-17	113	15		1	0
50000 - <100000	-23	-16	-147	-107		1
100000+	-12	258	192	115	228	
Net total	-106	536	-67	-102	520	-781
Net migration rate	-1.17	0.61	-0.05	-0.10	0.64	-0.70

Note: Net migrant numbers are displayed below the diagonal in each table. Above diagonal is shown the effectiveness of migration calculated as an absolute value of net migration divided by gross migration and expressed as a percentage.

Source: Calculations based on data from Danmarks Statistik.

Over the period 1985 –1998 population change by size bands (Table 6) was positive for all size bands except the few communes in the below 5000 population band which lost 5.2% of its population. The most significant increase of 5.8% was observed in the band with communes over 100000 inhabitants. All other bands showed increases close to the national average. This is a pattern of moderate concentration in largest urban centres and decrease in rural population.

Table 6: Population change by size band, Denmark, 1985–1998

Size Band	Population 1985	Population 1998	Population change in %
Below 5000	65393	61998	-5.2
5000 - <10000	859535	878370	2.2
10000 - <25000	1392476	1447062	3.9
25000 - <50000	962079	992633	3.2
50000 - <100000	778667	807080	3.6
100000+	1055607	1117145	5.8

Source: Calculations based on data from Danmarks Statistik

6.2 Relationship of migration to population density

Before we analyse the impact of population density on migration there is a need to make the reader aware of some specific features of the division of Denmark into communes and counties, according to the 1970 local government reform. One should distinguish between the Copenhagen region (the communes of Copenhagen and Frederiksberg, together with the counties of Copenhagen, Frederiksborg and Roskilde) and the rest of the country. In the Copenhagen region, there is intensive commuting between the communes. Migration may be expected to be determined primarily by housing market characteristics. Population density is probably the best criterion to distinguish between types of communes. Four types can be distinguished.

- (a) The central communes of Copenhagen and Frederiksberg have densities over 5000.
- (b) Suburban communes (all of the communes of Copenhagen county, and a few communes in the counties of Frederiksborg and Roskilde) have densities of 300-5000.
- (c) The old towns of Frederikssund, Frederiksværk, Helsingør, Hillerød, Køge and Roskilde) have densities of 150-1000.
- (d) Rural communes have densities below 300.

In the rest of the country, all contiguously built-up suburbs were amalgamated with the urban communes in 1970, so it is difficult to make any statements on their character based on population density. We can distinguish between urban communes, rural communes and mixed communes.

The distribution of population density (Figure 11) is characterised by a general East to West decrease with Copenhagen region having the highest density. Table 7 presents the net migration flows between municipalities classified by density band.

Table 7: Net migration and migration effectiveness ratios by population density band, Denmark, 1998

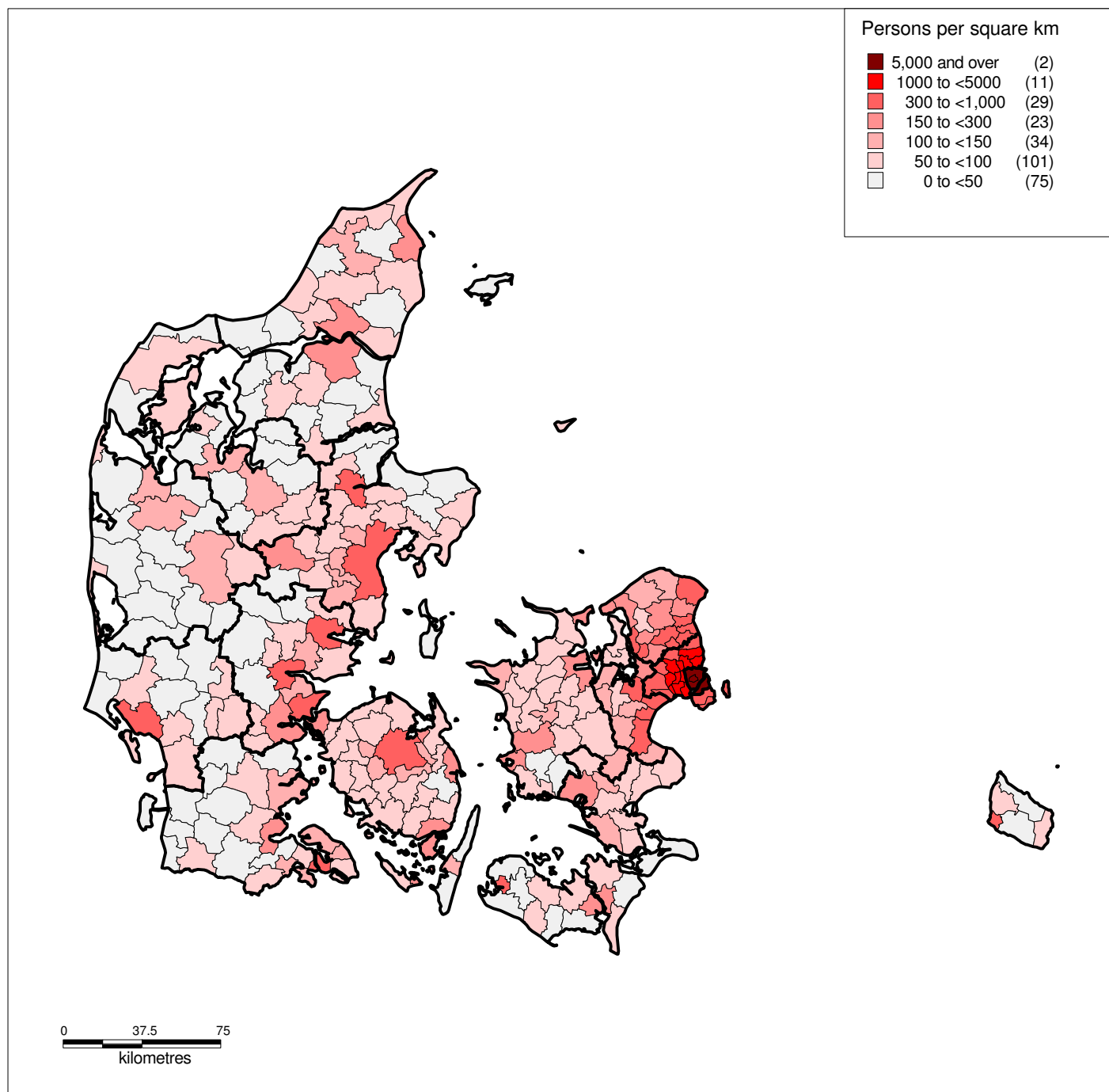
Population Density Band	< 50	50 – <100	100 – <150	150 – <300	300 – <1000	1000 – <5000	5000+
Less than 50		2	3	2	0	1	3
50 – <100	-286		1	1	2	1	1
100 – <150	-229	-120		0	3	1	0
150 – <300	-225	-83	28		2	1	1
300 – <1000	-16	522	424	415		1	3
1000 – <5000	-86	60	84	72	-154		2
5000+	-354	-247	-49	-91	-660	-149	
Net total	-1196	418	835	677	-2159	-124	1549
Net migration rate	-1.95	0.41	1.43	0.95	-1.58	-0.29	2.67

Note: Net migrant numbers are displayed below the diagonal in each table. Above diagonal is shown effectiveness of migration calculated as an absolute value of net migration divided by gross migration and expressed as a percentage.

Source: Calculated based on data from Danmarks Statistik

In 1998 the band with the highest density of population is a clear winner, gaining migrants from all other bands. Bands between 300 and 1000 and 1000 to 5000 persons per square kilometre lose population, particularly the former band, as does the lowest density band, represented in Western Jutland and on remote islands. This band loses population to all other bands. The effectiveness of migration is very low.

Figure 11: Municipalities in Denmark by density of population, 1998



The observed pattern of is far from uniform. Copenhagen is a gainer, other high density and suburban areas are losers, medium density areas are again gainers and low density areas – losers. There is therefore a mixture of concentration and deconcentration flows going on. Again, this unclear pattern is connected with the modest net migration flows and the short period of one year.

From 1985 to 1998, the only decrease of population occurred in the population density band between 1000 and 5000 persons per square kilometre (Table 8). A marginal increase 0.2% was observed in the lowest density band. The fastest increase was observed in 100 to 1000 persons per square kilometre bands, which might be called moderately urbanized.

Table 8: Population change by population density band, Denmark, 1985–1998

Population density band 1998	Population 1985	Population 1998	Population change in %
0-50	611763	613205	0.2
50-<100	991162	1021148	3.0
100-<150	554984	584396	5.3
150-<300	671915	709934	5.7
300-<1000	1284724	1363239	6.1
1000-<5000	435578	432973	-0.6
5000+	563631	579393	2.8

Source: Calculations based on data from Danmarks Statistik

Such a structure of population increases suggests lower attractiveness of areas with highest and lowest population densities.

6.3 Relationship of migration to the classification of communes based on their size and commuting pattern

Table 9 presents flows between various bands of communes defined on the basis of their size and commuting patterns. The definition of bands is presented in section 3.3.6 and Table 2. The classification adopted defines three urban classes: the capital city of Copenhagen, suburban communes of Copenhagen and communes with other towns exceeding 10000

Table 9: Net migration and migration effectiveness ratios by type of commune, Denmark, 1998

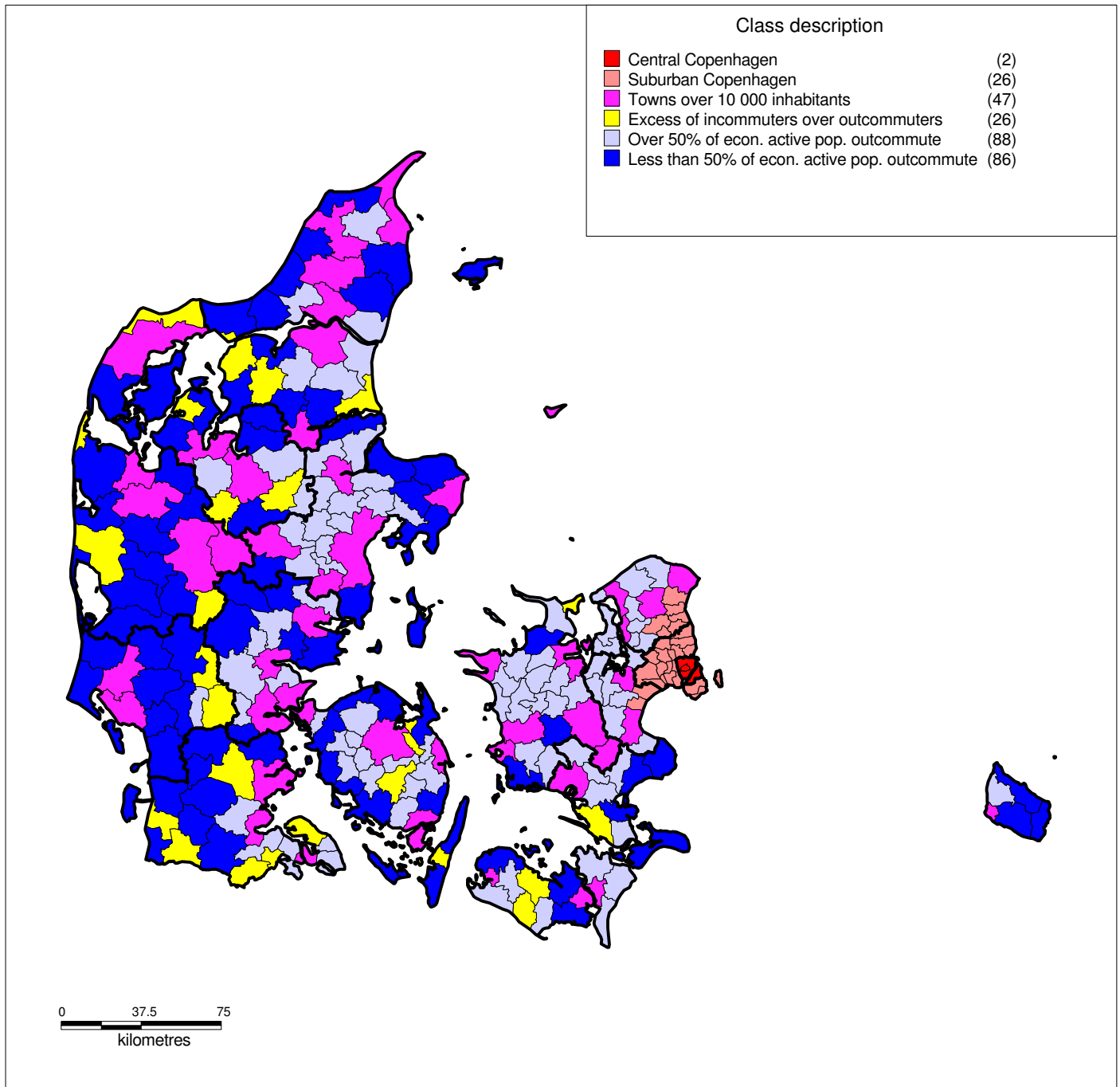
Type of commune: origin	Type of commune: destination					
	Copenhagen	Suburban communes of Copenhagen	Other towns	In-commuters excess out-commuters	Out-commuters dominated	Moderate out-commuting
Copenhagen		2	2	4	0	2
Suburban communes of Copenhagen	342		0	2	2	0
Other towns	743	52		1	2	0
In-commuters excess out-commuters	177	85	157		4	2
Out-commuters dominated	10	-371	-807	-195		2
Moderate out-commuting	276	-36	-120	-87	298	
Total	1549	-612	-1565	-700	1660	-332
Net migration rate	2.67	-0.72	-0.76	-2.64	2.27	-0.41

Note: Net migrant numbers are displayed below the diagonal in each table. Above diagonal is shown the effectiveness of migration calculated as the absolute value of net migration divided by gross migration and expressed as a percentage.

Source: Calculations based on data from Danmarks Statistik

inhabitants in the contiguous built-up area. The remaining communes were classified based on the relative size of in-commuting and out-commuting of economically active population. The geographic distribution of various types of communes is presented in Figure 12. It should be noted that communes in which over 50% of economically active population out-commute form the periurban economic hinterlands of the larger Danish cities and towns. Communes with an excess of in-commuters over out-commuters typically have one or a few large firms or institutions located in a relatively small settlement.

Figure 12: The classification of municipalities in Denmark according to commuting and urbanisation patterns, 1998



In 1998, the most successful class, in terms of migration gains, is the city of Copenhagen. This is, largely, due to very strong inflow of young people to the capital city, which is the only very large city in the country. Copenhagen gains population from all other bands, including Copenhagen's suburbs. The out-commuters-dominated non-urban band of communes is the other successful band, gaining population from all other bands but Copenhagen, to which its losses are negligible. All other bands have negative net migration. The band of suburban communes of Copenhagen show losses to all non-urban communes, which can be interpreted as counterurbanisation. The band with the relatively most important net loss of migrants is the non-urban class with more in-commuters than out-commuters. These communes are often specialized small settlements in a risky economic situation, even if some of them have fared well and attracted much in-migration. Effectiveness of migration is low and does not exceed 4% for any flow.

Population changes of populations of each of bands over the period 1985–1998 are shown in Table 10. The populations in all bands increased, but the rate of growth differed from band to band. Two bands, towns with 10000 or more inhabitants and communes dominated by out-commuters, increased their populations by over 5%. Copenhagen experienced a 2.8% increase, whereas increase in other bands stood below 2%. These discrepancies show the long term residential preferences of people, in particular the slow growth of the suburban ring and the medium speed of growth of Copenhagen.

Table 10: Population change by type of commune bands, Denmark, 1998

Type of commune	Population 1985	Population 1998	Population change in %
Copenhagen	563631	579393	2.8
Suburban communes of Copenhagen	840515	855248	1.8
Other towns	1952068	2061570	5.6
In-commuters excess out-commuters	259943	264845	1.9
Out-commuters dominated	696538	731280	5.0
Moderate out-commuting	801062	811952	1.4

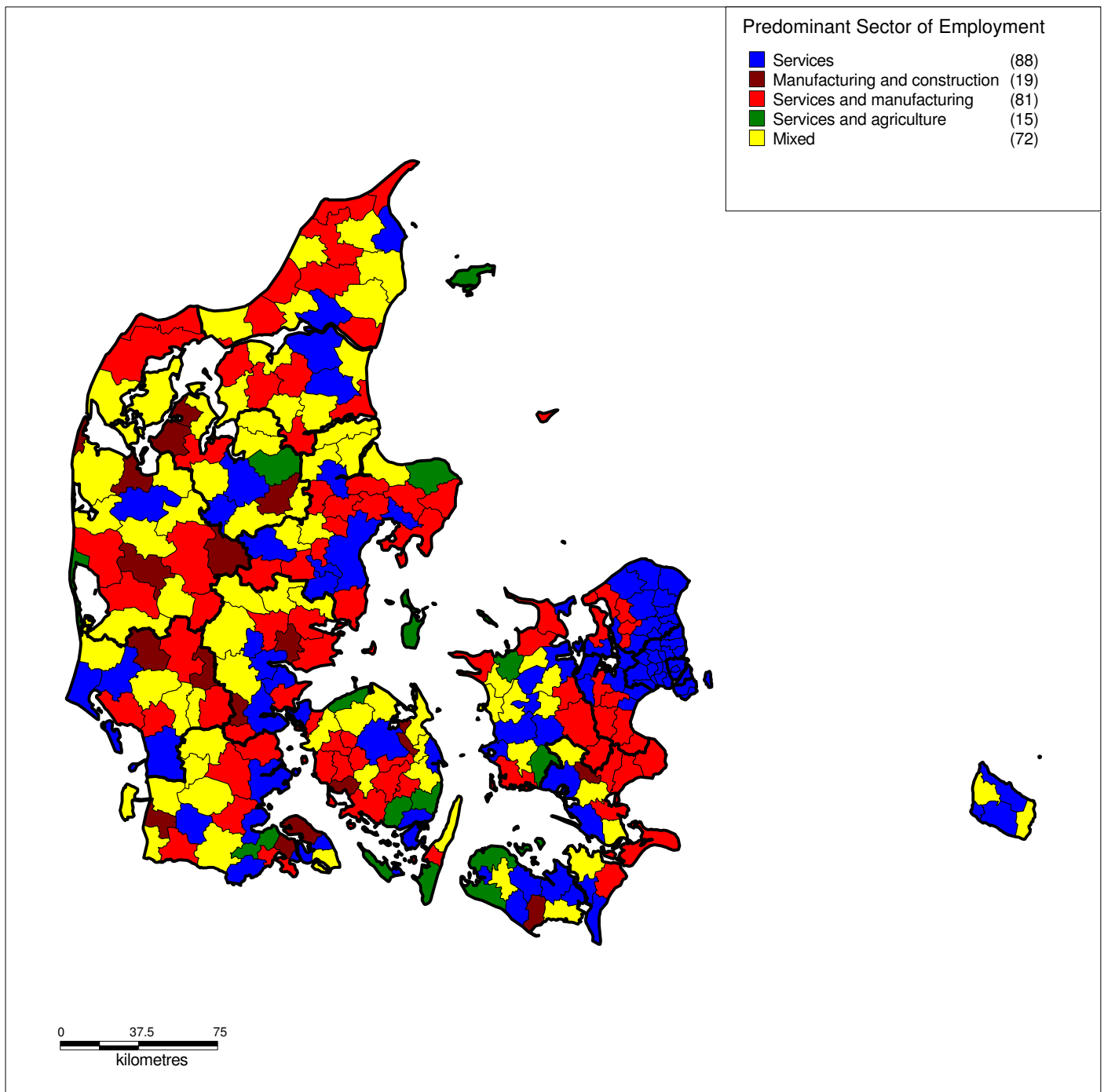
Source: Calculations based on data from Danmarks Statistik

7. RELATIONSHIP OF INTERNAL MIGRATION TO THE ECONOMIC CLASSIFICATION OF COMMUNES

Communes in Denmark were classified according to the structure of employment. Shares of employment in each of three sectors of economy: services, manufacturing and construction and agriculture were examined. Details of the classification are given in section 3.3.7 and Table 3. The spatial distribution of communes belonging to each class is shown in Figure 13. Communes in which employment in services is predominant are located in the Copenhagen region and in and around urban centres on islands and in Eastern Jutland. Manufacturing and construction dominated some rural communes and small towns, scattered in Jutland. The services and manufacturing class are distributed in a mosaic fashion all over Denmark and include both rural and urban communes. Communes belonging to remaining two classes are predominantly rural, the services and agricultural class best represented in the islands, the mixed class best in Jutland.

Table 11 reports the net migration flows between economic type bands. In 1998, communes classified as manufacturing and mixed are the losers in the process of population redistribution. The former class loses population to all other classes, the latter to all but manufacturing. The rate of net migration is also quite high by Danish standards, reaching respectively -2.68‰ and -1.47‰. The small services and agriculture band gains population from all other bands, and the services band gained population from all bands but the services and agriculture band. Communes dominated by services constitute the biggest gainer in absolute terms, whereas the service and agriculture band has the largest gains in terms of intensity. The manufacturing and services band has marginally positive net migration. This picture suggests a shift of population from areas with industrial to areas with post-industrial

Figure 13: The economic classification of municipalities in Denmark, 1998



economic base, but of course it must be kept in mind that the data only represent one year. The presence of services in the economic characteristics of a band secured positive balance of migration. Again, the effectiveness of net migration between these classes is modest.

Table 11: Net migration and migration effectiveness ratios by economic type band, Denmark, 1998

Economic type band: origin	Economic type band: destination				Mixed
	Services	Manufacturing	Services and manufacturing	Services and agriculture	
Services		3	0	1	1
Manufacturing	336		2	3	1
Services and manufacturing	248	-103		1	1
Services and agriculture	-47	-13	-24		2
Mixed	705	-28	196	31	
Total	1242	-481	28	115	-904
Net migration rate	0.39	-2.68	0.02	1.31	-1.47

Note: Net migrant numbers are displayed below the diagonal in each table. Above the diagonal is shown the effectiveness of migration calculated as an absolute value of net migration divided by gross migration and expressed as a percentage.

Source: Calculations based on data from Danmarks Statistik

Population growth over the period 1985–1998 (Table 12) shows a slightly different picture, where the services and services and manufacturing bands are the fastest growing, followed closely by the manufacturing band. The mixed band stagnated, whereas the small services and agriculture band contracted by 2.4%.

Table 12: Population change by economic type bands, Denmark, 1985 - 1998

Economic type band	Population 1985	Population 1998	Population change in %
Services	3079740	3213847	4.4
Manufacturing	172838	179221	3.7
Services and manufacturing	1156408	1207394	4.4
Services and agriculture	89837	87637	-2.4
Mixed	614934	616189	0.2

Source: Calculations based on data from Danmarks Statistik

8. RELATIONSHIP OF INTERNAL MIGRATION TO UNEMPLOYMENT

In comparison with other European countries the level of unemployment in Denmark has become quite low (6.6% in 1998). Only 49 communes, located in the southern islands and northern Jutland, fall into the band with 8% or more unemployed. The lowest unemployment, below 4%, can be seen in a belt of communes to the north of Copenhagen and in some communes of western Jutland (Figure 14).

The level of unemployment is governed by a complex combination of supply and demand factors. Low unemployment rates may be caused by growing demand (Western Jutland) and/or supply characterised by high skills (county of Frederiksborg). High unemployment rates may be explained by high supply of low-skill labour (commune of Copenhagen) and/or stagnating demand (counties of Storstrøm and Bornholm).

The 1998 pattern of flows between unemployment band (Table 13) cannot be interpreted easily: negative net migration flows are observed for the two lowest unemployment bands and positive for three highest unemployment bands. Net migration numbers are small, they represent only one year, hence one cannot expect good correlation. The effectiveness of migration is very low.

The combined effect of net internal migration, net international migration and natural growth results in the population change in unemployment bands. This parameter of population dynamics for the period 1985–1998 is shown in Table 14.

Figure 14: Municipalities in Denmark by unemployment rate, 1998

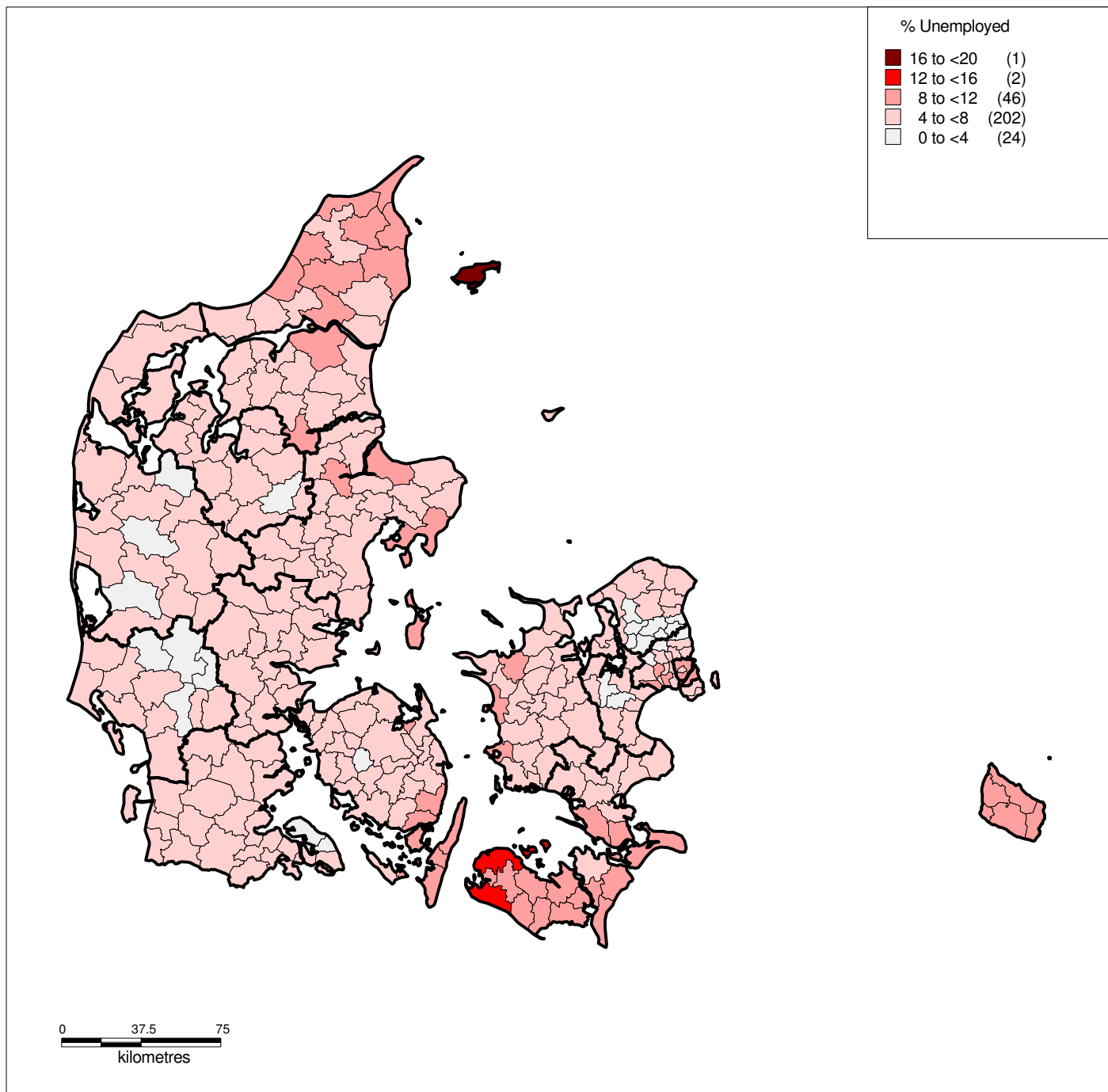


Table 13: Net migration and migration effectiveness ratios by rate of unemployment band, Denmark, 1998

Unemployment band: Origin	Unemployment band: Destination				
	< 4	4 - <6	6 - <8	8 - <10	10+
Less than 4		1	1	1	1
4 - <6	-160		0	0	0
6 - <8	-195	-330		0	0
8 - <10	-104	-59	142		0
10+	-19	-25	8	-9	
Net total	-478	-254	675	12	45
Net migration rate	-1.49	-0.13	0.38	0.01	0.25

Note: Net migrant numbers are displayed below the diagonal in each table. Above diagonal is shown effectiveness of migration calculated as an absolute value of net migration divided by gross migration and expressed as a percentage.

Source: Calculations based on data from Danmarks Statistik

Table 14: Population change by rate of unemployment bands, Denmark, 1998

Unemployment band	Population 1985	Population 1998	Population change in %
Less than 4	309292	320565	3.6
4 - <6	1886369	1958074	3.8
6 - <8	1670490	1758901	5.3
8 - <10	1055490	1083212	2.6
10+	192116	183536	-4.5

Source: Calculations based on data from Danmarks Statistik

There is no correlation between unemployment rates and change of population (Table 14), except for the large decrease of population in the highest unemployment level band. The latter has little significance due to its small population.

9. SUMMARY AND CONCLUSIONS

Below we summarise and interpret the main features of the Danish migration system.

The role of natural change, international migration and internal migration in population change

In the 1960s and 1970s Danish population has enjoyed a steady population growth fuelled mainly by positive natural change. The first half of 1980s witnessed negative natural change, which resulted in population decline. Natural losses were compensated in the second half of 1980s by growing international migration gains. In the last decade a steady growth was reinstated due to return to positive natural change and above all by positive and significant net international migration. Increasing longevity and decreasing fertility brought about considerable ageing of Danish population. However, the existing level of fertility does not allow for the replacement of population in a long term. The deficit could be offset by international migration (Hansen 1995).

Internal migration plays its role in the population redistribution in Denmark at both regional and subregional scales. The intensity of migration decreased slightly between 1985 and 1998, but the level of net migration remained mostly on the same very moderate level, which means that the pattern of gains and losses is unclear and difficult to interpret.

Urban concentration or deconcentration

The very substantial asymmetry of Danish settlement system, dominated by Copenhagen, influences to large extent the migration interactions in the country. The Copenhagen agglomeration grew rapidly from the second half of the 19th century until the 1970s, when the

population of the region stagnated. The internal distribution of population gradually became characterized by suburbanisation in the 1980s. The last decade, the 1990s, shows some signs of renewed growth in the metropolitan areas. Between 1985 and 1998 all the largest cities, Copenhagen, Aarhus, Odense, Aalborg and Esbjerg, increased their populations, sometimes quite significantly. In the agglomeration of Copenhagen, the city centre (Copenhagen and Frederiksberg) had moderate growth, but the surrounding ring of suburban communes lost population. Increases of urban populations were at the expense of rural and remote regions. This observation can be confirmed by the analysis of population change by size bands of communes over the period 1985–1998: population change was positive for all size bands (except the small class below 5000 population). The most significant increase of 5.8% was observed in the band with communes 100000 or more inhabitants.

In 1998 the overall pattern of population relocations between size bands of communes is quite complicated, showing a mixture of flows up and down the hierarchy: in the largest cities, smallest communes and medium size communes within the range of 10000 to 50000 inhabitants lose population. Gainers are medium sized cities with 50000 to 100000 inhabitants and small communes with populations from 5000 to 10000 inhabitants. On the other hand we can see a shift of population from areas with an industrial base to areas with a post-industrial economic base.

Relationship of population change and internal migration with population density

This picture is confirmed by the analysis of migration flows between density bands of communes. The band with the highest density of population gained migrants from all other bands. Bands between 300 and 1000 and 1000 to 5000 persons per square kilometre lose

population, as does the lowest density band, frequent in Western Jutland and on the remoter islands. This band loses population to all other bands.

Regional patterns of internal migration

From the point of view of migration gains and losses there is a clear division between Zealand and central eastern Jutland, and net migration losses in the rest of the country. The 1998 pattern of net migration modified to some extent the 1985 patterns. Most important changes could be summarised as follows: the city of Copenhagen turned from negative to positive net migration, as did a number of communes in the suburban ring of the capital. Other large cities turned from positive in 1985 to negative in 1998 net migration (Odense, Aarhus) or increased negative net migration (Aalborg). The other significant change was the increased negative net migration in Western Jutland and in Sønderjylland. If these changes continue, they would suggest a significant turnaround in the Danish migration system

Relationship of population change and internal migration to unemployment

The 1998 pattern of flows between unemployment band is difficult to interpret as the flows are small. It shows positive correlation between net migration and unemployment. More evidence can be extracted from the analysis of long term changes of population in unemployment bands between 1985 and 1998. A clear negative population development was observed in communes with high unemployment, suggesting positive response of migrants to the economic stimuli.

Relationship of internal migration to the life course

Migrants in the family ages show a strong pattern of suburbanisation and counterurbanisation, particularly apparent in the Copenhagen agglomeration. People in the

older working ages show a similar pattern. Retirement and elderly migration is small and shows a strong deconcentration pattern with preference to locations with good access to amenities. For young adults the principal destination is Copenhagen as well as other large cities: young people leave all rural and remote areas. The most important change from 1985 to 1998 is the increasing net migration into the biggest cities, which may be explained by the increasing number of students attracted by the educational institutions of these cities. A small part of this flow to the top of urban hierarchy is intercepted by smaller towns. The overall pattern for all ages could be described as a combination of periurbanisation in the Copenhagen, re-urbanisation in Copenhagen, combined with moderate outflows from rural areas.

REFERENCES

- Andersen O. 1977, *The Population of Denmark*. CICRED, Paris.
- Council of Europe. 1999, *Recent Demographic Developments in Europe*. Council of Europe Press, Strasbourg.
- Danmarks Statistik 1999, *Statistical Yearbook 1998*. Danmarks Statistik, Copenhagen.
- Hansen H. 1995, Some demographic impacts of current regional and ethnical differences in Denmark. In: *Evolution or Revolution in European Population. Vol.2 Contributed Papers: Sessions I-IV. European Population Conference*, EAPS – IUSSP – Franco Angelli. Milano. Pp.129-144
- Heilig K., 1997, *Demographics'96*. UNFPA, New York.
- Illeris S., 1984, Danish regional development during economic crisis. *Geografisk Tidsskrift*, 84, 53-62.
- Illeris S., 1994, *Essays on Regional Development in Europe*. Roskilde University, Roskilde.
- Illeris S., 1996, Changing patterns of net migration in Denmark: an explanatory analysis. In: Rees P., Stillwell J., Convey A. and Kupiszewski M. (eds.), *Population Migration in the European Union*. Wiley and Sons, London. Pp.105-122.
- Klaasen L., Molle W. and Pealinck J., 1981, *Dynamics of Urban Development*. Gower, Aldershot.
- Rees P. and Kupiszewski M., 1999, *Internal Migration and Regional Population Dynamics in Europe: A Synthesis*. Population Studies, No.32, Council of Europe Publishing, Strasbourg.
- Rees P., Durham H. and Kupiszewski M., 1996, *Internal Migration and Regional Population Dynamics in Europe: United Kingdom Case Study*, Report prepared for the Council of Europe and for the European Commission. Working Paper 96/20, School of Geography, University of Leeds. Web: www.geog.leeds.ac.uk/research/wpaper/WP96-20.pdf. Also available on CD with Rees and Kupiszewski, 1999.
- Rogers A. and Castro L., 1981, *Model Migration Schedules*. Research report RR-81-30, International Institute for Applied Systems Analysis, Laxenburg, Austria.
- Webb J., 1963, The natural and migration components of population changes in England and Wales, 1921-1931. *Economic Geography* 39, 2, 130-148.