EUROSTAT WORKING PAPERS

2001 EDITION

Regional International Migration and Foreign Population within the EU A feasibility study

(3/2001/E/n° 5)

3

EUROPEAN COMMISSION

eurostat

THEME 3
Population and social conditions

CONTENT

Population and social conditions **3/2001/E/n° 5**

Regional International Migration and Foreign Population within the EU
A feasibility study

N. van der Gaag, L. van Wissen – NIDI
J. Salt, Z. Lynas, J. Clarke – University College London

CONTENT

REGIONAL INTERNATIONAL MIGRATION AND FOREIGN POPULATION WITHIN THE EU
- a feasibility study -
Final Report

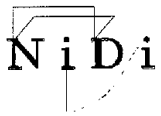
Report on behalf of the European Commission;
Directorate General XVI: Regional Policy and Cohesion
(tender ERDF no : 98/00/27/175)

Nicole van der Gaag, Leo van Wissen
Netherlands Interdisciplinary Demographic Institute

in cooperation with

John Salt, Zoë Lynas, James Clarke
Migration Research Unit, University College London

Final Report
March 2000



NIDI, P.O. Box 11650, 2502 AR The Hague, The Netherlands

PREFACE

Since 1985, the European Commission has been involved in a programme for compiling internationally consistent population and labour force projections for the countries of the European Union (EU) at both the national and the regional (NUTS 2) level. These basic projections are used for the preparation of European policies, regulations, directives and recommendations on various regional, economic and social issues. Four sets of population and labour force projections were made since 1985. The next revision is foreseen for the period 2002-2003. In addition, a comprehensive national and regional database has been compiled, containing data for all components of population change for several years.

Although in the past natural growth was by far the most significant component of population change in the European Union, in a growing number of EU countries the migration component is now more important than natural increase. Despite its key role in population growth, however, migration is very difficult to project. To investigate the possibilities for enhancing the international migration projection methodology, the European Commission, DG-XVI Regional Policy and Cohesion, funded a study to explore the feasibility of improving the quality of the migration assumptions by analysing the relationship between international migration flows and foreign population structures, both at the national and the regional level (tender ERDF no. 98/00/27/175). The current report documents the results of this study, which was carried out in close cooperation by the Netherlands Interdisciplinary Demographic Institute (NIDI) and the Migration Research Unit (MRU), University College London. NIDI was responsible for the empirical and methodological parts of the study, while MRU was responsible for the data evaluation parts.

In addition to the current study, NIDI and MRU are collaborating in several studies on forecasting of international migration. A related research programme, launched by Eurostat, is entitled 'Analysis and projection of international migration by major groups'. This programme covers several studies, of which until now two studies have been finished (part I and II). One of the aims of part II was to link stock and flow data at the *national* level. In part III of the programme, which is currently being carried out, this topic will be studied more exhaustively. The current study, therefore, focusses on the link between stocks and flows at the *regional* level.

The aim of the study is twofold. Firstly, to analyse the relationship at the regional NUTS 2 level between international migration flows and foreign population size and structure, and secondly to develop and improve methods to analyse and project migration trends and patterns. In order to achieve these objectives, existing national and regional studies have been evaluated, as well as the Eurostat database on stocks of foreign population and international migration flows. Furthermore, possible ways to establish a relationship between stocks and flows have been explored and possibilities to collect more detailed and meaningful statistics from national statistical institutes have been investigated. Finally, several recommendations for future research and data collection have been put forward.

The present study was conducted during the period February 1999 – February 2000. Many people have contributed to the project. Useful country specific information was obtained by the cooperation of contact persons in different countries. We are very much obliged to Hansjorg Bucher, Leo Eichperger, Alexander Hanika, Frederick Hollmann, Etienne Piguet, Maire Rodgers, Chris Shaw, Maria Pia Sorvillo and Jenny Wood. Furthermore we would like to thank all contact persons at Eurostat and the National Statistical Offices who helped us to

find our way in the regional migration databases. We also gratefully acknowledge the valuable comments on a previous version of the report by Philip Rees, John Stillwell and Heather Eyre of the School of Geography, University of Leeds. Finally, our thanks are due to Harri Cruijsen who supervised the progress of the work for the European Commission and whose suggestions for improvements contributed to the current content of the report.

The Hague, February 2000

CONTENT

1. INTRODUCTION

1.1 Background to the project

In the past two to three decades, international migration has become increasingly important as a source of population change. In a growing number of countries in the European Union (EU), international migration is now more important than natural increase (Münz, 1996). Despite its key role in population growth, however, migration is very difficult to project. As migration is often related to historical events and depends heavily on national policies, the uncertainties surrounding migration are tremendous. Since 1985, the European Commission has been involved in a programme for compiling internationally consistent population and labour force projections for the countries of the European Union (EU) at both the national and the regional (NUTS 2) level. These basic projections are used for the preparation of European policies, regulations, directives and recommendations on various regional, economic and social issues. Four sets of population and labour force projections were made since 1985 (NEI, 1986; Haverkate and Van Haselen, 1992; NEI, 1994; Van der Gaag *et al*, 1999). In addition, a comprehensive national and regional database has been compiled, containing data for all components of population change for several years. Current practice concerning the most recently compiled Eurostat population scenarios as well as the Eurostat database form the point of departure for the current study. In the latest Eurostat population scenarios, international migration hypotheses were basically a mixture of extrapolations of existing trends and expectations based on expert opinions and elaborations of theoretical notions (De Jong and Visser, 1997). The assumptions made were mainly related to possible economic developments and political responses to those developments which are assumed to affect international migration patterns. The subject of the current feasibility study is to explore whether the quality of international migration assumptions can be improved by analysing the relationship between international migration flows and foreign population structures. Ideally, if all data requirements will be met, possible suggestions for improvement may be implemented in the next revision of the Eurostat population scenarios, which is foreseen for the period 2002-2003.

As a result of huge inflows of migrants in the past, today considerable groups of non-native population have settled in most countries of the European Union and by now a growing number of studies has given attention to the role of networks in international migration processes (Wilpert, 1992; Massey *et al*, 1993; Esveldt *et al*, 1995). As networks of migrants may play a role in attracting new migrants (Hugo, 1981; Boyd, 1989; Fawcett, 1989; Böcker, 1994), knowledge on the resident stocks of migrant populations may be useful in projecting future immigration and emigration flows. Moreover, emigration of non-nationals generally depends on changes in the size and structure of the foreign population.

The theoretical rationale for this study is described in the report: *Analysis and forecasting of international migration by major groups*, Part I (Salt and Singleton, 1995). The quantitative relationship between stocks and flows at the national level for various European countries was analysed in Part II of this study (Van der Gaag and Van Wissen, 1999a). This relationship will be discussed more exhaustively in part III. The current feasibility study, therefore, focusses on the regional dimension in the relationship between stocks and flows of foreign population. A related study on the linkages between stocks and flows of foreign population is carried out by Bretz and Voit (1999). Their study aims at improving migration statistics as well as statistics on the stock of foreign population by comparing two different sources of stocks and flow data

for Germany. The main outcome of this study is a (rough) estimation procedure of long-term and short-term migrants to and from Germany.

After the Second World War, mainly three successive flows of immigration to the EU can be distinguished: labour migration, family migration (reunification and formation), and asylum migration (Fassmann and Münz, 1992; King, 1993, Van de Kaa, 1996). Especially in the case of family migration, the link between stocks and flows of migrants is evident. The processes through which these family migrants are attracted to specific regions are complex. The institutional setting, e.g. the labour market and the housing market, is important as well. In general terms, family migration is usually only possible if there is a dwelling unit available. Asylum migration, on the other hand, is highly regulated. For the current study the regional allocation system of asylum migrants is important. If allocation rules are governed, at least partly, by the presence or absence of resident stocks of migrants, then also for asylum migrants there is a link between stocks and flows.

The resident stock of foreign population not only affects immigration flows. Emigration flows too, may be directly influenced. The impact of the regional dimension on emigration rates, however, is largely unknown. Therefore, the present study investigates to what extent regional emigration data are available, or may be made available. In addition, some theoretical aspects of regional differences in return migration will be discussed.

1.2 The definition of foreign population

In order to study the relationship between stocks and flows of foreign population, stocks and flows of migrants need to be well-defined. Unfortunately, there is no common agreement on how to define stocks of migrants. There is not even a common ground for defining immigrants or emigrants among the European countries (Poulain and Gisser, 1992). Although in 1976 the United Nations adopted a set of recommendations on statistics of international migration, no country of the EU implemented strictly the UN-definition, i.e. an individual entering the national territory with the intention of residing there at least for one year, having been absent also at least for one year. Only the United Kingdom used the definition of a long-term migrant as proposed by the UN until 1994. Since 1995, however, the data on net migration have been adjusted to also include persons who are admitted as visitors but are subsequently permitted to stay for longer periods because they changed status, for instance by marriage or application for asylum (United Nations, 1998a). Other countries use other lengths of intended stay, or use different criteria, such as the intention to occupy a dwelling. Once entered into the country, the immigrant becomes a member of the population with an immigration history. Generally, there is no agreement about the most appropriate statistical definition of this group, and different concepts are used, such as:

1. Immigrant population;
2. Population of foreign origin;
3. Non-nationals;
4. (Non-native) ethnic groups.

The criteria used for these concepts are different as well. In order to improve international migration statistics, the 1976 UN-recommendations have been reviewed (United Nations, 1998a). In this revision it is stated that the need for information on stocks of international migrants often relates to persons who do not have the citizenship of the country where they

live (foreigners defined by present nationality or citizenship) and to those who, despite having the citizenship of the country where they live, were born in another country (the foreign-born). Other criteria used are: nationality of the parents, country of birth of the parents, socio-cultural background or country of previous residence. In order to create every possible breakdown, Poulain (1993) proposed to categorize the population stock according to the following variables:

1. Present nationality;
2. Nationality at birth;
3. Nationality of mother and father;
4. Place of birth;
5. Mother's usual place of residence at birth of child;
6. Ethnic background;
7. Duration of residence;
8. Date of entry into the country;
9. Age at entry.

Even this list is not complete. In the Netherlands for example, the definition of 'allochtoon' is based on the country of birth of the person *and* of his parents. Thus, place of birth of the parents should be added to the list.

To define a network as meant in the theoretical model of network migration, the definition of the stock should ideally include at least two criteria: a link with the origin country (country of birth of the person) and a socio-cultural identification (ethnicity; Waldorf, 1996). Unfortunately, from a data availability perspective, current citizenship of the person is the most realistic option for internationally comparable data in Europe (Haug *et al*, 1998). A complicating factor of using citizenship in defining stocks of foreign population, however, is that one should take into account naturalisations and dual citizenship as well, which is highly different across countries (Eurostat, 1995a).

1.3 The NUTS classification

The current feasibility study focusses on the regional dimension in the relationship between stocks and flows of foreign population at the NUTS 2 level. The NUTS classification (Nomenclature des Unités Territoriales Statistiques) has been developed by Eurostat, in cooperation with other departments of the European Commission (Eurostat, 1995b). This classification comprises six hierarchical levels. NUTS 0 corresponds to the country as a whole, NUTS 5 is the smallest scale (municipality level) and NUTS 2 is somewhere in between. The national administrative divisions to which the NUTS classification corresponds vary from country to country. For Belgium, Spain, Italy and the Netherlands, for example, NUTS 2 is equivalent to the provincial level. For the EU Member States Denmark, Ireland and Luxembourg, NUTS 2 coincides with the national level. For Denmark, however, an 'implicit' NUTS-2 level can be used. In 1998, for some countries (Finland, Germany, Sweden and the United Kingdom) the NUTS classification has been changed. For the United Kingdom for example, the NUTS classification has been changed following a reorganisation of local government. This resulted in 37 NUTS 2 regions (compared to 35 regions according to the 1995 definition). For the current study, the 1995 NUTS classification has been used.

1.4 Aims and outline

The purpose of the current study is to explore the feasibility of improving the quality of international migration assumptions by analyzing the relationship between international migration flows and foreign population structures. The aim of the study is twofold. Firstly, to analyse theoretical and empirical relationships at the regional NUTS 2 level between international migration flows and foreign population size and structure, and secondly to develop and improve methods to analyse and project migration trends and patterns.

In order to achieve these objectives, four activities were carried out:

1 Existing studies on the influence of the size and structure of foreign population on the magnitude of immigration and emigration flows have been evaluated. In addition, some complementary data analyses have been carried out. By means of this evaluation and analyses we investigated which aspects seem to be most important in describing the relationships between stocks and flows and what kind of data is needed to study those relationships. The results of this activity are described in chapter 2 and 3;

2 In chapter 4, possible ways to establish a relationship between stocks and flows are explored from a methodological point of view;

3 The quality and utility of international migration and foreign population data series at the national and the regional NUTS 2 level currently available at Eurostat, are studied in chapter 5. Their strengths and weaknesses in forecasting at the regional level are discussed. Detailed country-specific information can be found in Annexes 1 and 2; Moreover, feasible routes to fill possible gaps in the database are delineated in this chapter. Attention has been paid to which data are available in the individual countries and at other organizations.

4 Finally, in chapter 6, the main conclusions are summarized and recommendations are given for future research and further data collection.

2. THE REGIONAL PATTERN OF MIGRANTS

National and regional country-specific studies to link stocks and flows of international migrants are very scarce. As the relationship between regional stocks and flows concerns a relatively new field of research, this is not really surprising. At the same time, the problem has many dimensions and several sub-topics are related to the main subject of the study. For instance, immigrant populations tend to be strongly concentrated geographically and different groups of immigrants tend to have different geographical distributions. Knowledge on both of these topics may be valuable as well. Therefore, section 2.1 describes the spatial distribution of stocks and flows of foreign population, while section 2.2 pays attention to differences between groups of migrants. Furthermore, it is important to know whether regional migration patterns are stable over time. If regional patterns tend to change, then assumptions have to be formulated on how these patterns develop. In section 2.3, the stability over time of regional immigration patterns is studied. Emigration flows, like immigration, may vary across regions as well. Differences in emigration and return migration are discussed in section 2.4. As data on emigration are often of lower quality than immigration data - there is often no obvious reason for individuals to record their departure (Salt *et al*, 1994) -, emigration will be discussed only briefly. In section 2.5 finally, attention is paid to the regional allocation of asylum migrants. Asylum migration is highly regulated, which may have implications for the regional distribution of migration too. Moreover, as in the 1990s international migration in Europe was strongly determined by asylum migration, chain migration generated by asylum migrants is important as well.

2.1 The regional distribution of stocks and flows of foreign population

When looking at the regional distribution of immigrants in EU countries, it appears that a large share of migrants is attracted to just a few urban regions. The inflows of labour, which started in the 1960s during the years of economic prosperity, and which later developed into family migration, have created whole communities of ethnic minorities in most large European cities. Within each country certain common patterns of settlement are found. Originally, most immigrants have settled in the urban areas because there was a demand for relatively unskilled low wage labour and a lack of technical qualifications was no barrier to employment. Later on, family migration flows have enlarged these initial labour migration patterns. As a result, by now the foreign population is heavily concentrated in the urban areas. European cities with currently high percentages of foreign population are for instance Paris, Berlin, Frankfurt, Köln, Munich, London, Amsterdam, Rotterdam, The Hague, and Brussels (White, 1993; Coleman, 1994; Bucher, 1996; Van Huis and Nicolaas, 1999).

This spatial pattern of migrants is not unique for Europe. Today's immigrants in the United States, for instance, locate in a relatively small number of states and metropolitan areas (Rogers and Raymer, 1998) and immigrants to Canada too, are highly concentrated in a few provinces (Papademetriou, 1994).

Empirical analysis

To have a closer look at more recently observed national and regional (NUTS 2) patterns of immigration flows and stocks of foreign populations in the countries of the European Union, some recent data were analysed for a restricted number of EU countries. Only those countries

were taken into account for which both regional stock and flow data were available at the NUTS 2 level for a relatively recent year and for which the NUTS 2 level does not correspond to the country as a whole. Data were analysed for Austria (1997), Finland (flows: 1997; stocks: 1995), Germany (flows: 1995; stocks: 1996), Greece (1997; flows: non-nationals only), Italy (flows: 1996; stocks: 1994), the Netherlands (flows: 1997; stocks: 1998) and Spain (flows: 1996; stocks: 1995) (see also Van der Gaag and Van Wissen, 1999b). All data except those for Germany were made available by Eurostat. Unfortunately, with the exception of Greece, only total flows were available; flows of foreign nationals could not be distinguished. For Greece, only flows of non-nationals were available. For Germany, data on stocks and flows for both nationals and non-nationals at the NUTS 2 level were collected through Internet ('Statistik Regional' a collection of regional statistics provided by the Statistical Offices of the Länder). Although in principle data were available at NUTS 2 level for Denmark, France and Sweden too, those countries were not included in the study as Denmark consists of only three 'implicit' NUTS 2 regions, for France data were 'too old' (1990) and for Sweden we did not have the appropriate data (NUTS 2 1995 classification) at our disposal at the time of the analyses. Stocks of foreign population here are defined as persons with a foreign citizenship, that is, persons with a citizenship other than the one of the country in which the person lives (at 1 January).

At 1 January 1997 about 5 percent of the inhabitants of the European Union were persons with a foreign citizenship. In most countries, the proportion of foreigners is relatively low. By far the highest proportion is found in the smallest country Luxembourg (34 percent). Other countries with relatively high proportions of foreign citizens (about 9 percent) are Austria, Germany and Belgium. Relatively low proportions (between 1 and 2 percent) are found in the southern countries and in Finland (Eurostat, 1999).

Within countries, the foreign population is very unevenly spread across regions. Urban regions often account for a disproportionately high share of persons with foreign citizenship. Border regions may be relatively attractive regions too because of their geographical location. Border migration may be especially important between neighbouring countries who are both members of the EU. In the EU in principle free movement of people exist, which is often concentrated near the borders of the countries involved. For the current study, a classification of NUTS 2 regions has been made in four categories: urban regions, urban-border regions, border regions and other regions. There are several ways to define urban and rural areas. The United Nations concept of 'urban agglomerations' for example refers to the population contained within the contours of a contiguous territory inhabited at urban levels without regard to administrative boundaries. It includes the population in a city or town plus the suburban fringe. Many countries, however do not use the statistical concept of 'urban agglomeration' (United Nations, 1998b). Another common used approach is to identify densely populated areas as urban and sparsely populated areas as rural. As using solely population density is a very simple and naive system, often one or more additional characteristics of areas are taken into account as well. This approach for example, is used in DGXVI Sixth Periodic Report on the Social and Economic Situation and Development of the Regions of the European Union (Mouqué, 1999) in which three urban-rural classes are distinguished: densely populated areas (groups of municipalities with more than 500 inhabitants per square km and a total population of more than 50,000), intermediate areas (100 to 500 inhabitants per square km and a total population of more than 50,000, or else adjacent to a densely populated area) and thinly populated ones (all remaining areas). For the current study we need a classification of urban and rural areas at the NUTS 2 level. As NUTS 2 regions differ highly across countries, it is not possible to identify urban regions within

countries according to one uniform definition of exlusively population density. In Italy for instance, population density of none of the NUTS 2 regions exceeds 500 persons per square km., while in the Netherlands the population density of more than half of the regions exceeds 300 (Eurostat, 1999). Therefore, in this study a region is classified as 'urban' as it contains at least one of the largest cities of a country (Eurostat, 1993). For Austria, Finland and Greece, this is solely the NUTS 2 region which contains the capital city: Vienna, Uusimaa (Helsinki) and Athens, respectively. If an urban region happens to be a border region too, this region is classified as urban-border. Urban regions in Spain are urban-border: Cataluña (Barcelona) and urban: Madrid; in Italy: urban-border: Lombardia (Milano) and urban: Campania (Napoli) and Lazio (Roma); in the Netherlands: urban only: Noord-Holland (Amsterdam), Zuid-Holland (Rotterdam and Den Haag) and Utrecht; and in Germany: urban-border: Düsseldorf, Karlsruhe, Köln, Oberbayern (München), Sachsen (Leipzig, Dresden), and urban: Berlin, Bremen, Darmstadt (Frankfurt), Hamburg, Hannover, and Stuttgart. As migration patterns from Central Europe to EU-countries may differ from migration patterns between two countries which both are Member States of the EU, with respect to (non-urban) border regions, for Austria and Germany a further distinction was made according to the country on which a region borders: 'border-west', if it borders on a western European country, or 'border-east' if it borders on a Central European country. Similarly, for Spain a distinction was drawn between regions which border on France, which is *not* part of the Iberian Peninsula, and on Portugal, which *is* part of the Iberian Peninsula (*Figure 2.1*).

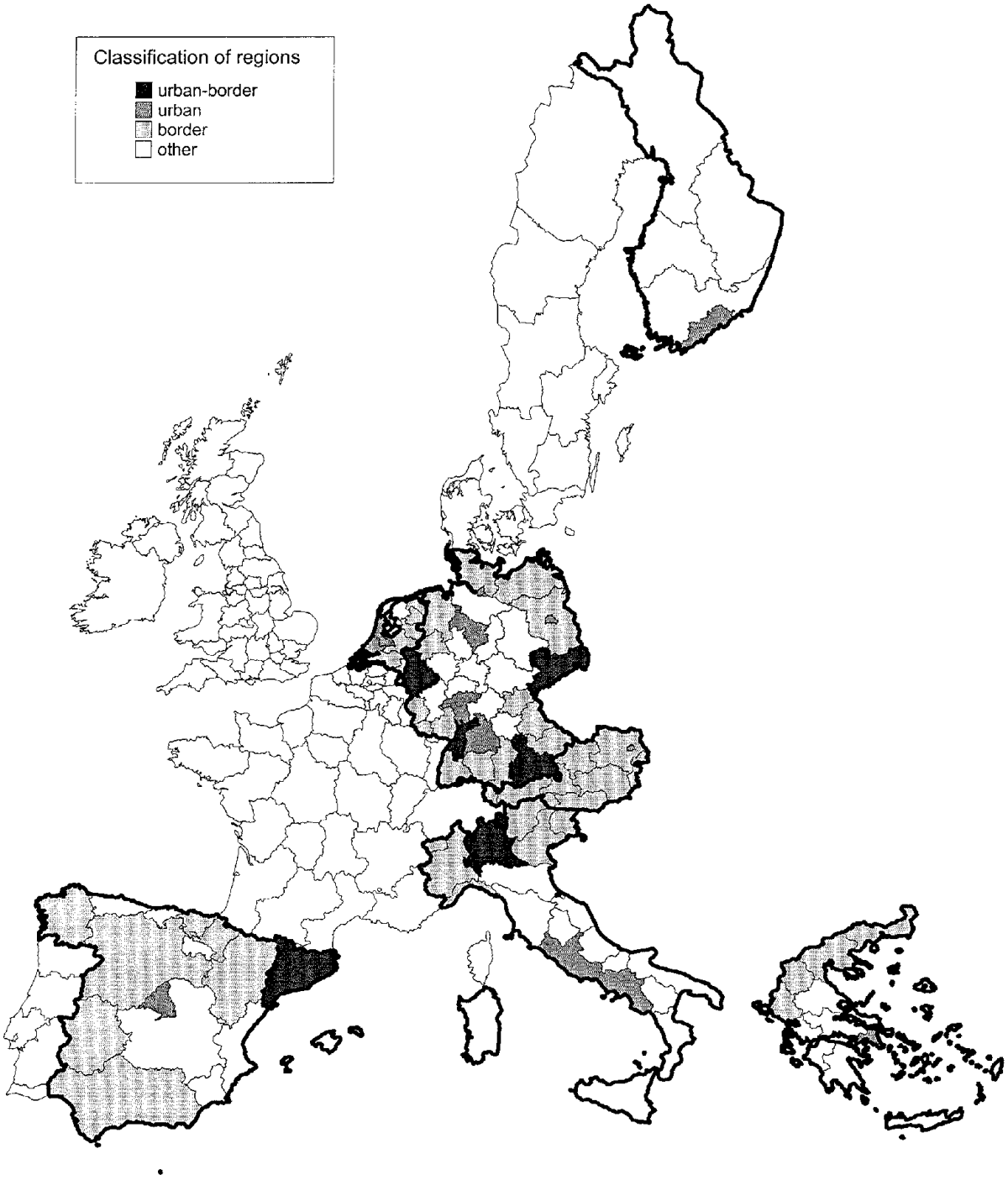
Regional stocks of foreign population

At present (around 1996), in the seven EU-countries included in this study, regions with the most sizeable numbers of people with a foreign citizenship are found in Germany, the Netherlands and Austria (*Figure 2.2*). Generally, in these countries migrant populations are not only accomodated in the urban regions, but also, although to a lesser extent, in most of the other regions. In the remaining countries, the highest numbers of foreign population are found in the urban areas.

In general in all countries the share of the population of foreign citizenship in urban regions is much higher than their share in total population. In Greece for example, 58 percent of all foreigners live in the NUTS 2 region Athens while only 33 percent of all inhabitants live in this capital region (*Table 2.1*). In Finland and Austria too, relatively high proportions of foreigners are found in the capital regions (51 and 37 percent of all foreigners, respectively, compared with 26 and 20 percent of all inhabitants). Also in Germany, Italy, the Netherlands and Spain, relatively many foreign citizens live in the urban regions (*Figure 2.3*).

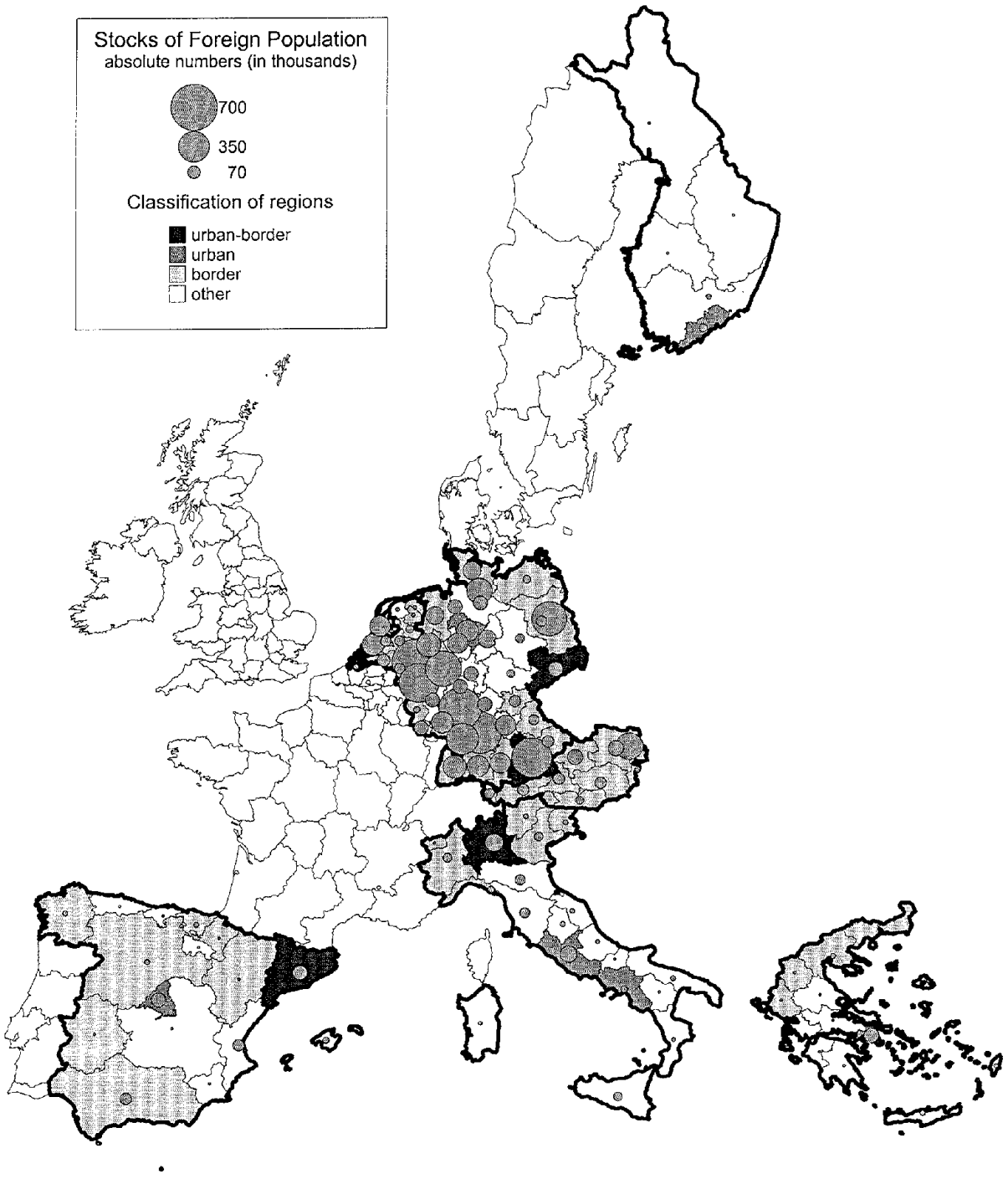
Overall, the spatial distribution of migrants in the non-urban border regions shows the opposite pattern. In Austria more than 60 percent of the total population lives in regions which border on Eastern European countries. These regions account for 40 percent of the stocks of foreign population. In contrast, the share in the migrant population of regions on the western borders outnumbers their share in total population. Although a substantial part of Germany borders on Poland and the Czech Republic, less than 10 percent of its population and just over 3 percent of all migrants live in this part of the country. The stock of foreign population in non-urban border regions in western Germany is more in balance with total population. About 20 percent of the inhabitants of Germany lives in these regions. The share in the migrant population is moderately lower. Apart from Cataluna, border regions in Spain are relatively unimportant for the migrant population irrespective whether they border on France or on Portugal. The same pattern was found for the Netherlands and Greece.

Figure 2.1: Classification of regions



European Union NUTS 2 regions (1995 classification; Sachsen-Anhalt, Germany: NUTS 1)

Figure 2.2: Population with a foreign citizenship (around 1996)



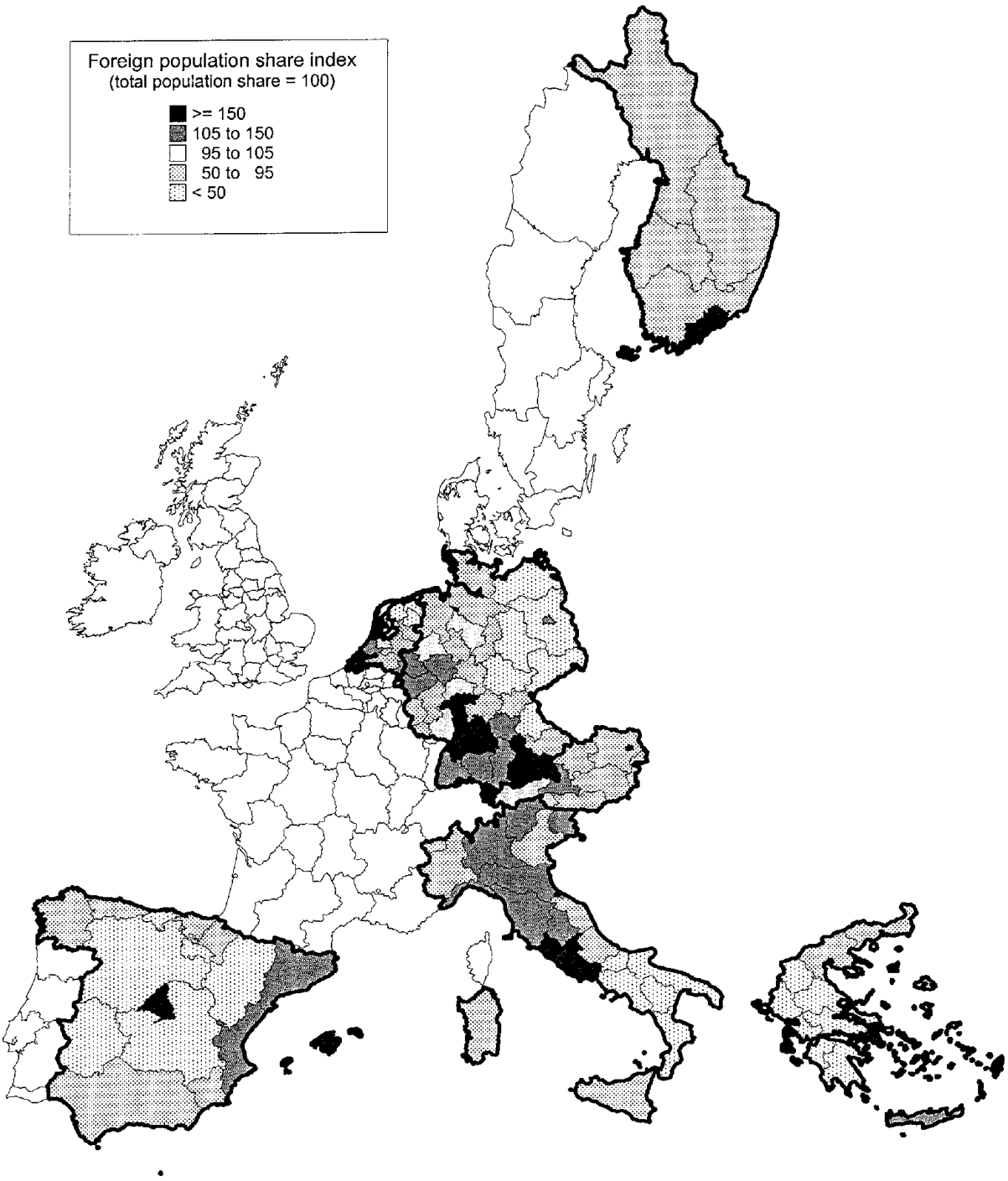
European Union NUTS 2 regions (1995 classification; Sachsen-Anhalt, Germany: NUTS 1)

Table 2.1: Regional shares in stocks of foreign population and total population (± 1996)

		Number of Regions	Foreign Population	Total Population	Index *
urban regions					
Austria		1	37	20	1.86
Finland		1	51	26	1.97
Greece		1	58	33	1.76
Italy	urban-border	1	22	16	1.42
	urban-other	2	23	19	1.22
The Netherlands		3	60	44	1.36
Spain	urban-border	1	19	15	1.20
	urban-other	1	21	13	1.63
Germany	urban-border	5	30	25	1.19
	urban-other	6	29	19	1.53
non-urban border regions					
Austria	border-east	5	40	61	0.65
	border-west	3	23	19	1.23
Greece		4	16	29	0.54
Italy		6	21	22	0.95
The Netherlands		7	36	50	0.73
Spain	border-France	3	5	10	0.52
	border-Portugal	4	21	34	0.62
Germany	border-east	5	3	9	0.36
	border-west	9	18	20	0.89
other regions					
Finland		5	49	74	0.66
Greece		8	26	38	0.69
Italy		11	34	43	0.78
The Netherlands		2	3	6	0.55
Spain		9	34	28	1.22
Germany **		11	19	26	0.75

* share of foreign population divided by share of total population
** Sachsen-Anhalt: NUTS 1

Figure 2.3: Foreign population share index (around 1996; share in total population = 100)



European Union NUTS 2 regions (1995 classification; Sachsen-Anhalt, Germany: NUTS 1)

In Italy, the size of the migrant populations in non-urban border regions, is slightly lower than their share in total population.

For the remaining regions, only in the east coast of Spain (including the Canary Islands) the overall share of population with a foreign citizenship is higher than their share in total population. For all other countries, the share of the foreign population is less than the share in total population.

Immigration flows

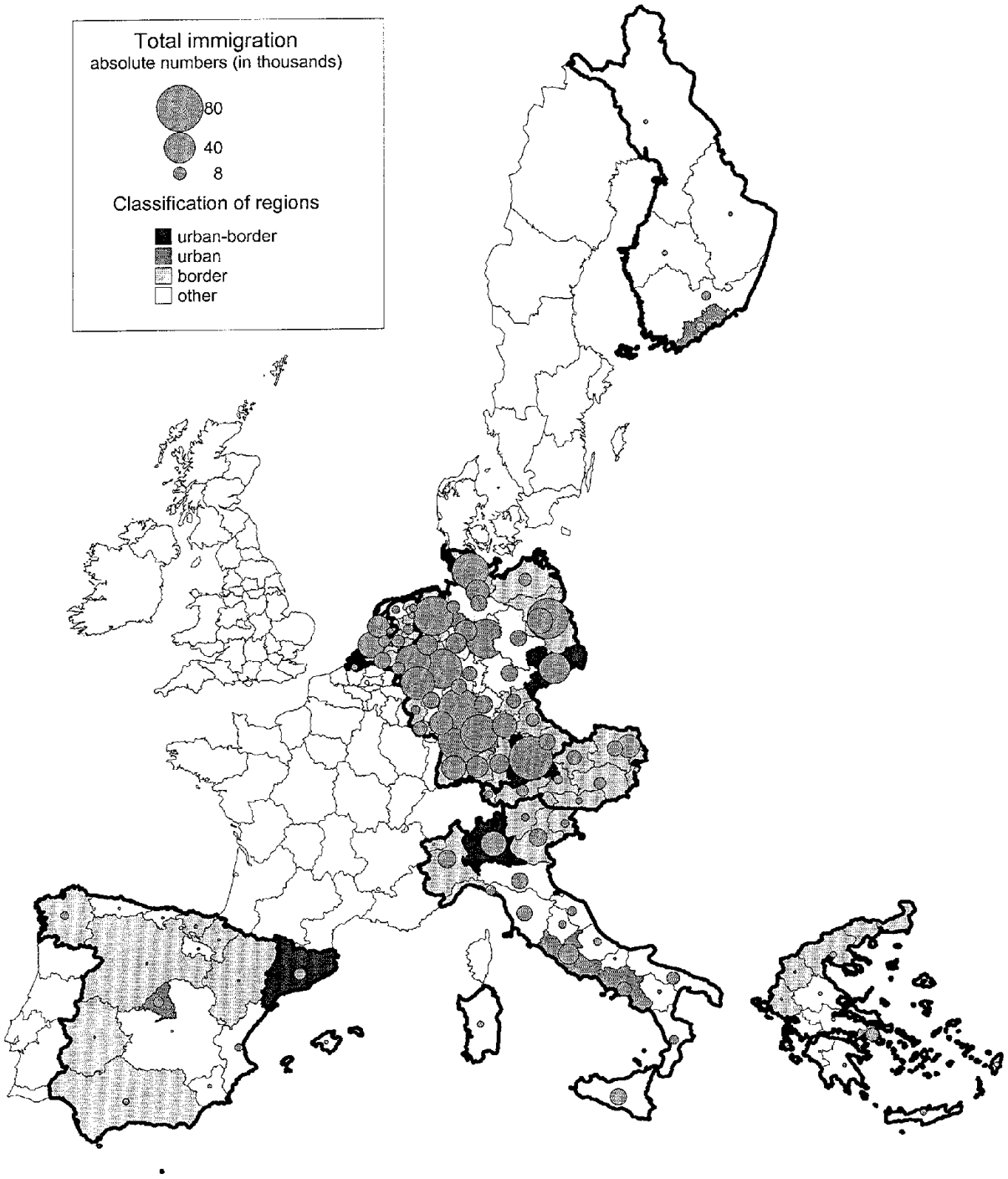
Similar to the stocks of foreign population, regions with high numbers of immigrants are found in Germany, the Netherlands and Austria. In addition, in Italy too sizeable inflows of migrants are found in most of the regions (*Figure 2.4*).

If we compare total immigration flows with total population we may conclude that, with the exception of Italy and Germany, the share of immigration into urban regions is in general significantly higher than expected on the basis of their share in total population (*Table 2.2*). On the whole, urban-border regions are not more attractive to migrants than urban regions that do not border on another country.

Immigration shares in non-urban border regions on the other hand, are in general significantly lower compared to their total population shares. Exceptions are Italy and the border-west regions of Austria and Germany. In Italy, however, the regional immigration pattern seems much more determined by differences in wealth, than by differences in geographical location or urbanization. The richer north of the country is relatively much more attractive to immigrants than the poorer south (*Figure 2.5*). In Germany, the border-west regions Karlsruhe and Weser-Ems attract much more immigrants than expected on their share in total population. Ethnic German immigrants may have played an important role here, as international immigration of ethnic Germans is highly directed to only a few counties. In the first half of the 1990s, 80 percent of the ethnic German immigrants were concentrated on just eight counties with big 'check-in institutions'. Two of those counties are located in Weser-Ems and Karlsruhe, respectively (Bucher, 1999, see also section 2.2). The other border-west regions in Germany attract less immigrants than expected on the basis of their population share.

Finally, for the other regions, a mixed pattern was found. Only for Finland, the immigration share in the other regions was significantly less than their share in total population. This is not surprising though, as in Finland immigration is strongly concentrated in the Helsinki area. In the other countries, immigration shares in these other regions were only slightly different from their population shares.

Figure 2.4: Total immigration (around 1996)



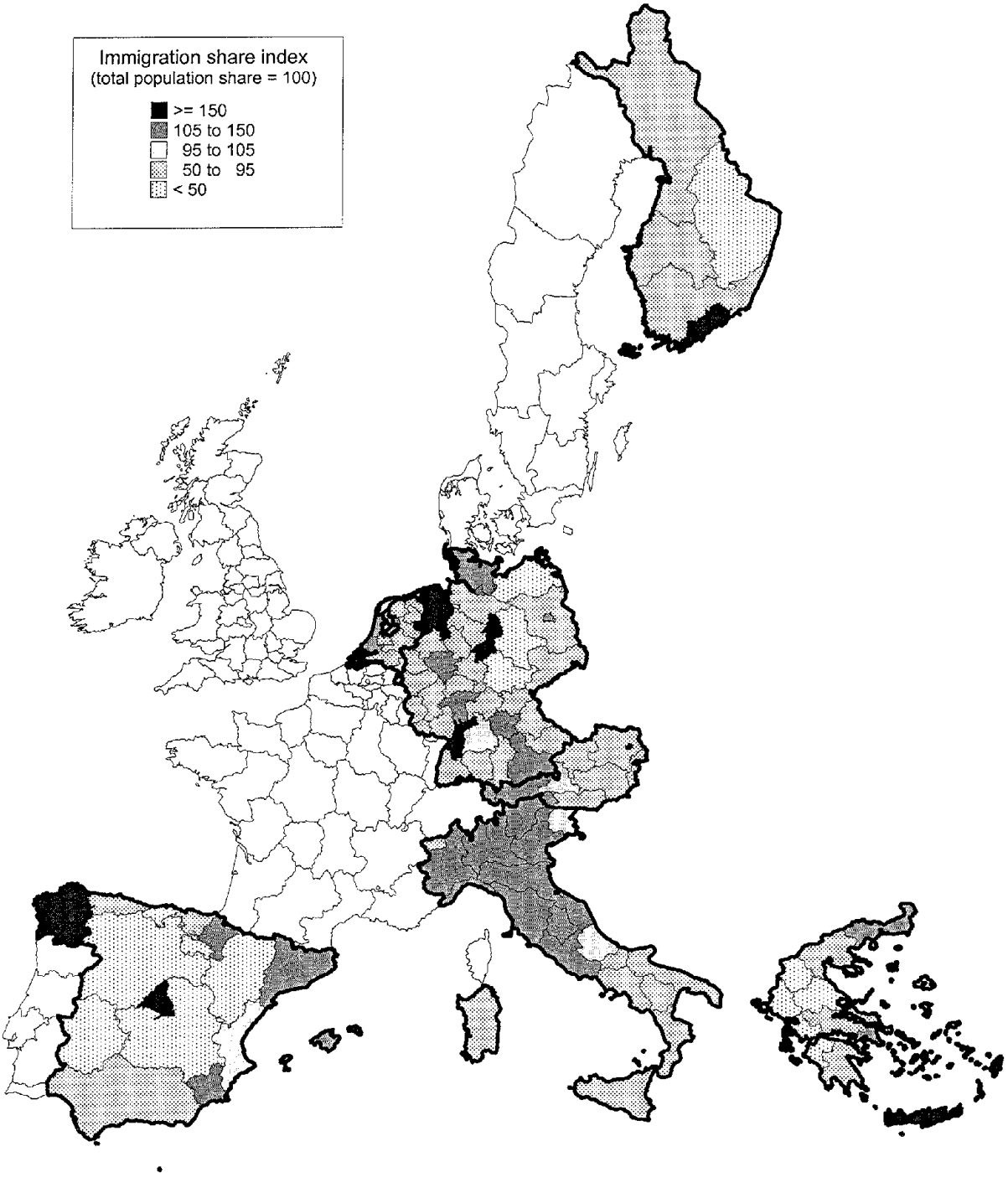
European Union NUTS 2 regions (1995 classification; Sachsen-Anhalt, Germany: NUTS 1; Greece: non-nationals only)

Table 2.2: Regional shares in immigration and total population (± 1996)

		Number of Regions	Total Immigration	Total Population	Index *
urban regions					
Austria		1	33	20	1.65
Finland		1	43	26	1.65
Greece **		1	40	33	1.22
Italy	urban-border	1	17	16	1.10
	urban-other	2	17	19	0.90
The Netherlands		3	54	44	1.22
Spain	urban-border	1	22	15	1.41
	urban-other	1	20	13	1.57
Germany	urban-border	5	26	25	1.02
	urban-other	6	22	19	1.15
non-urban border regions					
Austria	border-east	5	45	61	0.74
	border-west	3	22	19	1.18
Greece		4	21	29	0.73
Italy		6	26	22	1.18
The Netherlands		7	40	50	0.80
Spain	border-France	3	5	10	0.50
	border-Portugal	4	23	34	0.69
Germany	border-east	5	6	9	0.69
	border-west	9	22	20	1.05
other regions					
Finland		5	57	74	0.77
Greece		8	39	38	1.01
Italy		11	40	43	0.92
The Netherlands		2	6	6	1.04
Spain		9	30	28	1.07
Germany ***		11	24	26	0.92

* share of total immigration divided by share of total population
** immigration of non-nationals only
*** Sachsen-Anhalt: NUTS 1

Figure 2.5: Immigration share index (around 1996; share in total population = 100)



European Union NUTS 2 regions (1995 classification; Sachsen-Anhalt, Germany: NUTS 1; Greece: non-nationals only)

Conclusion

Summarizing the existing studies as well as the results of the additional analysis, we may conclude that urban regions account for a disproportionately high share of migrant populations as well as of immigrants. Non-urban border regions, on the other hand, account for relatively low shares in immigration. Only in Italy and the border regions in the western part of Germany and Austria a slightly higher share in immigration flows is observed compared with their share in total population. In almost all countries and all types of regions considerable differences were found between the proportions of immigrants and total inhabitants. Therefore, an allocation of immigrants proportional to the size of the total population is in general not correct. With respect to future developments, it is important to know whether regional patterns of immigration change over time (see also section 2.3). For instance nowadays ethnic Germans play a less important role in immigration in Germany compared to the beginning of the 1990s, which may affect the regional pattern of immigration.

2.2 Differences between groups of immigrants

A striking feature of regional immigration and settlement patterns is diversity. Different immigrant populations tend to have different geographical distributions. Irish immigrants in the United Kingdom, for instance, are concentrated in the North-West (Manchester), in the West Midlands, and in London and the South-East. New Commonwealth and Pakistan (NCWP) immigrants, on the other hand, are concentrated in regions where major cities and conurbations are situated, particularly in the South-East. Not all the conurbations, however, have a high proportion of NCWP immigrants. Areas where unemployment was already high, such as Glasgow, Tyneside and, initially, Liverpool, did not attract a lot of migrants, demonstrating the impact of regional labour market developments on immigration patterns. Furthermore, the regional concentrations of different NCWP immigrants and their descendants are quite different (Coleman and Salt, 1992). In the Netherlands too, different immigrant groups are closely linked to specific regions. Turkish immigrants, for instance, are often directed to The Hague, while Surinamese more often settle in Amsterdam. The most obvious example, however, is that of migrants of the Cape Verde Islands. Just over 80 per cent of all Cape Verdians in the Netherlands live in Rotterdam and, even more significant, in 1997 almost all immigrants of those islands migrated to this municipality (Van Huis and Nicolaas, 1999).

Comparable patterns are found in Australia and New Zealand. On both sides of the Tasman Sea, different groups of migrants have shown different settlement preferences. In Australia, for example, migrants born in southern Europe have settled mainly in Melbourne and to a lesser extent in Sydney and Adelaide, while migrants born in India and Africa have settled disproportionately in Perth, which is probably due to its proximity to Asia. Compared with other migrant groups, British and northern Europeans are located relatively dispersed in Australian and New Zealand cities, because of their cultural, including linguistic, similarities with the native-born residents (Buetow, 1994)

Empirical analysis

For Germany and the Netherlands, regional patterns of stocks of foreign population and flows of international migration were available for nationals and non-nationals. For the Netherlands

a further distinction could be made by ethnic origin. Five groups of migrants could be distinguished: Antillean, Moroccan, Turkeys, Surinames, and migrants from 'other developing countries' at both the NUTS 2 and the NUTS 3 level (see for a more detailed definition, section 4.5). For both countries it was studied whether regional migration patterns differ for nationals and non-nationals respectively.

Germany

For Germany a distinction could be made between regional immigration flows of nationals and non-nationals (*Table 2.3*). A comparison of these two types of immigration shows that the immigration flows of nationals are more evenly distributed over the three different types of regions (urban, non-urban-border and other) than the flows of non-nationals. Immigration of non-nationals is much more concentrated in the urban regions than immigration of nationals. More than 56 percent of all non-national immigrants chose one of the urban regions as their destination against only 25 percent of the German nationals. As mentioned before, however, the spatial distribution of ethnic immigrants (or 'Aussiedler'), who form a large part of the immigrants with a German citizenship, is highly concentrated in only a few regions with special check-in institutions. In those check-in institutions, which are mostly located outside the urban regions, ethnic immigrants are being prepared to live in the German society (Bucher, 1999). After leaving these institutions, however, ethnic Germans may choose another destination region. Therefore, the final regional pattern may be different from the original pattern at entry and internal migration patterns may be biased by the immigration flows of Aussiedler (see also Stillwell *et al*, 1999).

Compared with the spatial pattern of the German population, immigration of Germans is relatively low in the urban regions and the non-urban border regions in the eastern part of the country. In the remaining regions immigration is relatively high. For non-nationals, on the other hand, the regional pattern of immigration is more or less proportional to the spatial distribution of the stocks of non-German population. Only the non-urban border regions in the eastern part of Germany receive a relatively high share of foreign immigrants.

A relevant question here is whether there is a relationship between regional stocks of national or foreign populations and the regional distribution of immigration of nationals or non-nationals, respectively. In chapter 4 this question will be tackled analytically. Here we will give a preliminary descriptive answer. In *Figures 2.6 and 2.7*, for all NUTS 2 regions in Germany (Sachsen-Anhalt at the NUTS 1 level) their shares in stocks of nationals respectively non-nationals are plotted against their shares in immigration. Not surprisingly, given the biased regional pattern of nationals due to the check-in institutions, there are hardly similarities between the spatial distribution of German immigrants and stocks of Germans. For non-Germans, on the other hand, a relationship does exist: the higher the share in the stocks the higher the share in immigration.

Table 2.3: Regional shares in immigration and total population for nationals and non-nationals, Germany (1995)

	Nationals			Non-nationals		
	Immigration	**Population**	**Index***	**Immigration**	**Population**	**Index***
urban regions						
urban-border	18	25	0.71	29	30	0.96
urban-other	8	18	0.43	27	29	0.94
non-urban-border regions						
border-east	7	10	0.70	6	3	1.86
border-west	32	21	1.53	18	18	0.97
other regions	35	27	1.30	20	19	1.02

* Share in immigration divided by share in population

The Netherlands

For the Netherlands, for stocks as well as flows of non-nationals a further distinction could be made by ethnic origin (see for a more detailed definition, section 4.5). Five groups of migrants were distinguished: Antillean, Moroccan, Turkeys, Surinames, and migrants from 'other developing countries'. As non of those groups originate from countries which border on the Netherlands, for this section we took into account two classes of regions only: urban and non-urban. Furthermore, regional distributions at both the NUTS 2 and NUTS 3 level were taken into account. There are 40 NUTS 3 regions in the Netherlands (the so-called 'COROP ' level of urban agglomerations). At the NUTS 3 level, the following regions, which capture the four largest urban areas of the Netherlands, were classified as urban (Eurostat, 1993): Groot-Amsterdam (the Amsterdam agglomeration), Groot-Rijnmond (the Rotterdam agglomeration), Agglomeratie 's-Gravenhage (the The Hague agglomeration) and Utrecht (the Utrecht agglomeration). As before, at the NUTS 2 level the three regions Noord-Holland, Zuid-Holland and Utrecht were classified as urban.

Similar to Germany, in the Netherlands by far the highest share of immigrants as well as of stocks of foreign population is found in the urban regions. This is especially the case for Surinamese, of which even 80 percent of the stocks lives in the three urban NUTS 2 regions. Also almost 80 percent of the Surinamese immigrants, is directed to those regions (*Table 2.4*). Immigrants from other developing countries, on the other hand, are oriented to the urban areas to a lesser extent. At the NUTS 3 level too, high shares of immigrants and stocks of foreign population are found in the four urban regions (*Table 2.5*). In general, in urban regions the share in immigration is less than the share in population while in non-urban regions the opposite is true.

Figure 2.6: Shares of stocks and flows of nationals, NUTS 2 Germany

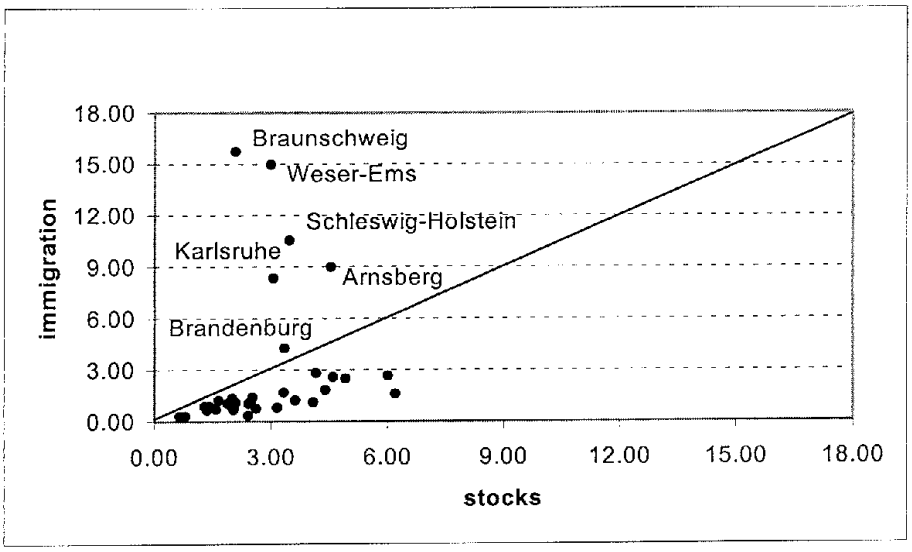


Figure 2.7: Shares of stocks and flows of non-nationals, NUTS 2 Germany

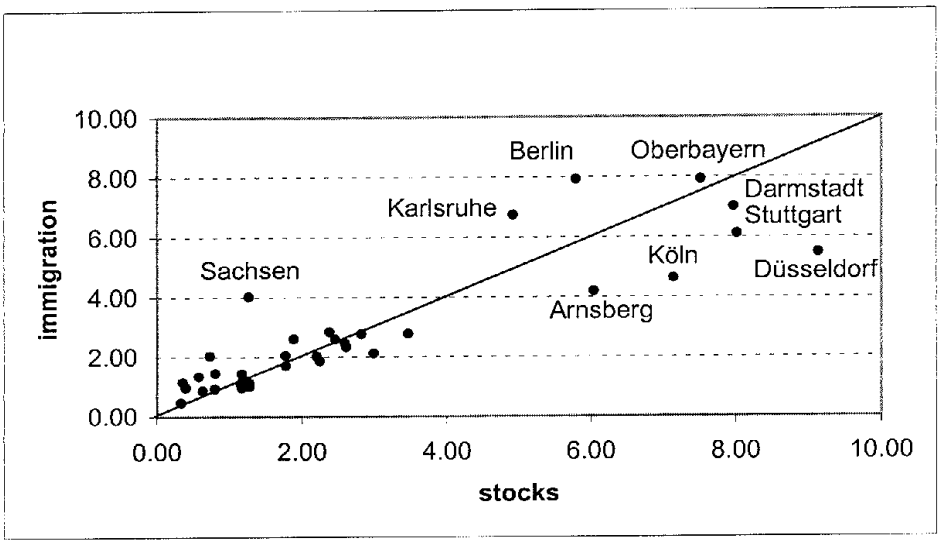


Table 2.4: Regional shares in immigration and population for five groups of migrants, the Netherlands, NUTS 2 (1995)

		Immigration	Population	Index*
Antilles (A)	urban	61	64	0.94
	non-urban	39	36	1.10
Morocco (M)	urban	69	71	0.96
	non-urban	31	29	1.10
Turkey (T)	urban	59	59	0.99
	non-urban	41	41	1.01
Surinam (S)	urban	77	80	0.96
	non-urban	23	20	1.16
Other developing countries (O)	urban	49	60	0.80
	non-urban	51	40	1.30
Total (A+M+T+S+O)	urban	53	67	0.80
	non-urban	47	33	1.41

* Share in immigration divided by share in population

Looking at the plotted values of the immigration shares against the shares in foreign population, there appears to be a linear relationship between shares in stocks and flows for all groups of migrants distinguished (*Figures 2.8 and 2.9*). The largest deviations were found for the urban regions. In general the share of immigrants in the NUTS 2 region Noord-Holland, or in the NUTS 3 region Groot-Amsterdam is substantially lower than the share of foreign population. For the NUTS 2 region Zuid-Holland, or the NUTS 3 region Agglomeratie 's-Gravenhage the opposite is true. The linear pattern even applies to the group of migrants of other developing countries, which comprises the large group of immigrants from developing countries in Africa, Asia and South America of which refugees and asylum seekers form a substantial part. All Dutch municipalities are obliged by law to accommodate a certain number of Convention refugees and persons holding humanitarian status. The regional distribution of those migrants is based solely on the number of inhabitants living in each municipality, and not on other factors, among which the number of aliens already living in the municipality (Liebaut and Hughes, 1997). Nevertheless, there seems to be a linear relationship between shares of foreign population and immigration flows for this group of migrants as well.

For a quantitative analysis of the relationship between stocks and flows see section 4.5.

Table 2.5: Regional shares in immigration and population for five groups of migrants, the Netherlands, NUTS 3 (1995)

		Immigration	Population	Index*
Antilles (A)	urban	49	48	1.00
	non-urban	51	52	1.00
Morocco (M)	urban	53	57	0.93
	non-urban	47	43	1.09
Turkey (T)	urban	46	45	1.02
	non-urban	54	55	0.98
Surinam (S)	urban	68	71	0.96
	non-urban	32	29	1.11
Other developing countries (O)	urban	33	45	0.73
	non-urban	67	55	1.22
Total (A+M+T+S+O)	urban	39	53	0.73
	non-urban	61	47	1.31

* Share of immigration divided by share in population

Conclusion

To summarize, we may conclude that different immigrant populations, defined by for instance citizenship or country of birth, show different settlement patterns. In addition to this general conclusion, in a study for the United Kingdom a relationship with unemployment was found: although urban regions often were favourable destinations for immigrants, urban regions with high unemployment did not attract a lot of migrants.

The empirical analyses for both Germany and the Netherlands confirm the conclusion that different immigrant populations show different settlement patterns. For Germany (1995) we may assume that urban regions and border regions in the eastern part of the country were especially important destination areas for immigrants of foreign citizenship, while border regions in the west and the remaining regions were more important areas for German nationals. The pattern of German nationals, however, was highly determined by the location of the so-called "check-in" institutions where ethnic Germans, after their arrival in Germany, are being prepared to live in the German society. The spatial allocation of immigration flows of non-nationals over the aggregate level of different types of regions (urban, non-urban and other) proportional to the stocks of foreign population seems to give a reasonable estimate. This proportionality does not apply at the lower regional classification of the NUTS 2 level. Nevertheless, at the NUTS 2 level too, a relationship seems to exist: the higher the share in the stocks, the higher the share in immigration.

Figure 2.8: Shares of stocks and flows of non-nationals, five groups of migrants (Antilles (A), Morocco (M), Turkey (T), Surinam (S), Other developing countries (O)), NUTS 2 the Netherlands (1995)

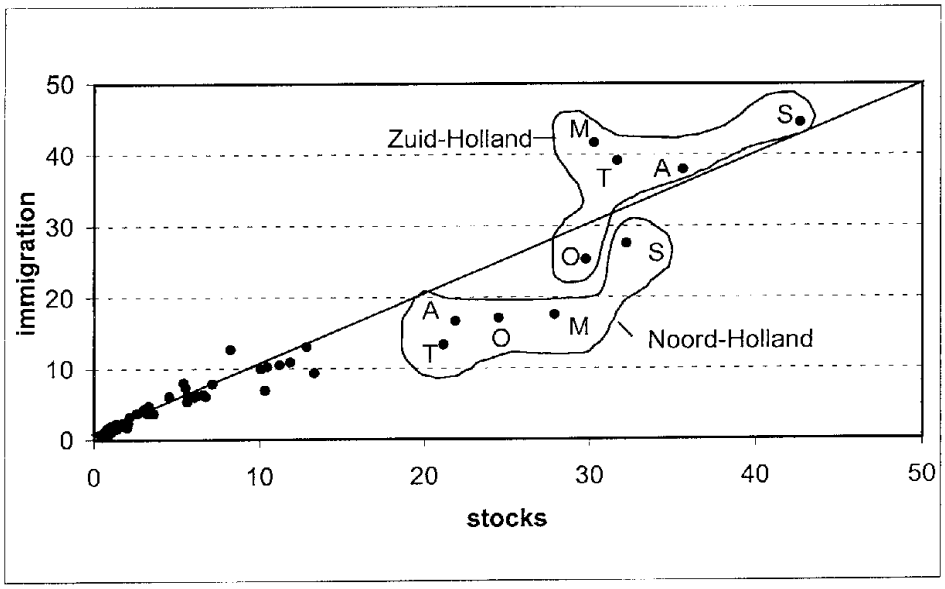
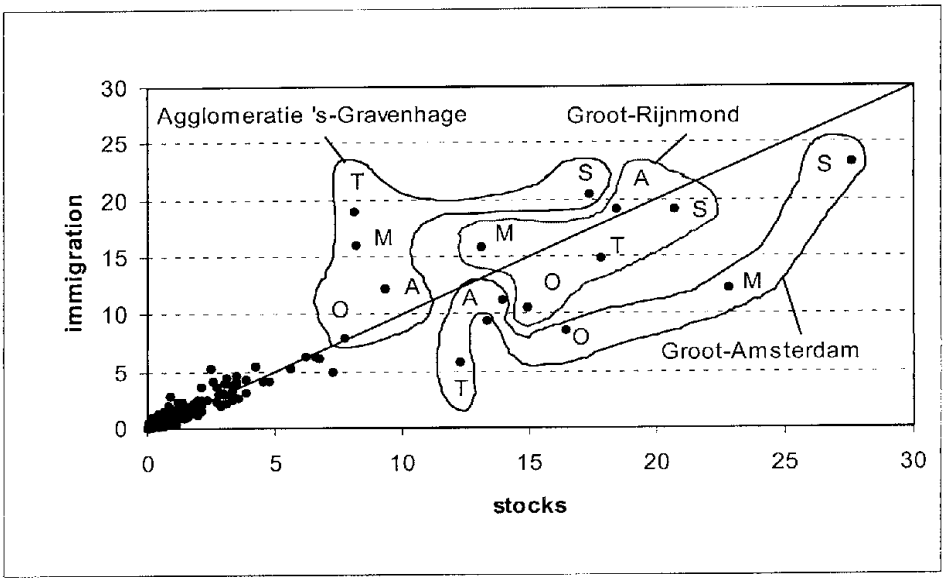


Figure 2.9: Shares of stocks and flows of non-nationals, five groups of migrants (Antilles (A), Morocco (M), Turkey (T), Surinam (S), Other developing countries (O)), NUTS 3 the Netherlands (1995)

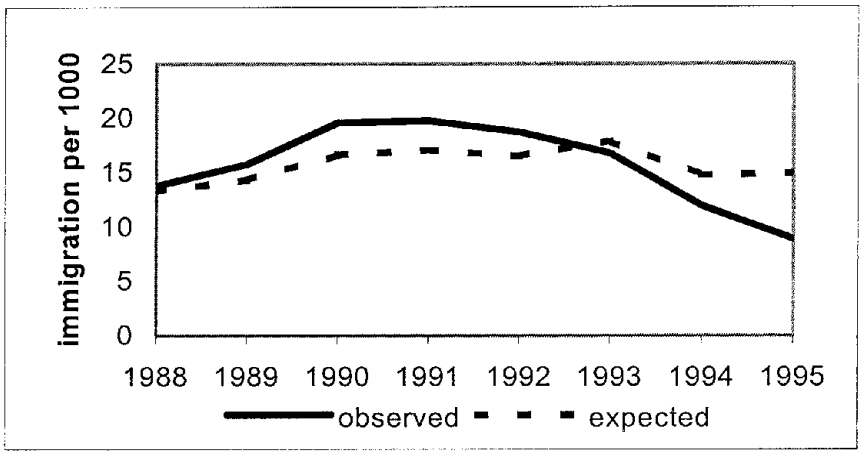


For the Netherlands (1995), for most groups of migrants distinguished a linear relationship between stocks and flows appears to exist at both the NUTS 2 and the NUTS 3 level. The largest deviations were found for the urban areas Zuid-Holland and Noord-Holland at the NUTS 2 level, and Agglomeratie 's-Gravenhage and Groot-Amsterdam at the NUTS 3 level. Although in general at the aggregate level the share of immigration in urban regions is somewhat lower than their share in foreign population, looking at individual NUTS regions immigration in Zuid-Holland or Agglomeratie 's-Gravenhage is higher than the share in foreign population. This is especially the case for migrants from Turkey and Morocco.

2.3 Stability over time of regional patterns of immigration

How stable is the regional pattern of immigration? This question has been addressed by Van der Gaag and Van Wissen (1999b) using regional data on total immigration at the NUTS 3 level for the Netherlands in the period 1988-1995. It has been shown that between 1988 and 1992 the regional pattern of immigration in the Netherlands was very stable, after which stability reduced significantly. In other words, the regional pattern of immigration in the nineties is changing. How it is changing may be observed when looking at the individual regions. As an example, *Figure 2.10* shows the time trend of the immigration intensity for Groot-Amsterdam as well as the hypothetical time trend under perfect stability. The difference between both curves is a measure of stability for this region. This picture shows that observed immigration, when compared to the hypothetical stable pattern, drops significantly after 1993. This pattern is more or less typical for all four urban regions. When looking at the individual regional patterns, it can be concluded that the instability in the four urban regions is caused by a decrease of the level of immigration after 1992, which is accompanied by an increase in immigration in the non-urban regions.

Figure 2.10 *Observed immigration intensity and expected immigration under stability for region Groot-Amsterdam*



Conclusion

Between 1988 and 1992, the regional pattern of immigration in the Netherlands was very stable, after which this pattern changed. After 1992, the four urban regions experienced a declining level of immigration while immigration in the non-urban regions has increased.

2.4 Differences in emigration rates and return migration

Emigration of foreign population (return migration or remigration), is not just the mirror process of immigration. According to Dustmann (1996), return migration is an underrated research field of considerable significance for policy. After all, a large proportion of migrants actually return. Dustmann describes migrants' return propensities, return behaviour, and subsequent return evaluations. To summarize his findings, the following picture emerges: return propensities of migrants increase with the age of entry, but decrease with the number of years of residence. From the moment a migrant has decided to return someday, however, the remaining years in the country decrease with the years of residence and, keeping years of residence constant, with entry age. Surprisingly, whether the migrant is in the labour force or whether he is registered as unemployed did not significantly affect return propensities. On the other hand, the remaining number of years in the host country was affected, and therefore indirectly return propensities were affected too.

Furthermore, return intentions are quite differently developed between the various nationalities, for instance migrants from former Yugoslavia have stronger intentions to remain permanently in Germany, while the opposite is true for Greek migrants. These nationality effects may reflect differences in the economic or political situation between host and home countries; or they may be a measure of national identity, which positively affects return propensities.

A study by De Beer and Tjemmes (1996) for the Netherlands also shows that remigration rates differ strongly between various categories of immigrants. For example, about one half of the immigrants from the United Kingdom is expected to emigrate, in contrast with only 10% of the Moroccan immigrants. Huisman and Van Wissen (1998) too, found different return migration probabilities in the Netherlands for five groups of non-native residents. However, it was also found that one year of observation is too little for precise statistical estimation of regional emigration rates by migrant groups. More years should be taken into account.

Empirical analysis

To have a closer look at the regional emigration patterns for different groups of foreign population, we calculated NUTS 2 emigration probabilities for the Netherlands for five groups of non-native residents (*Table 2.6*). By far the highest emigration probabilities were found for migrants of Antillean origin (overall about 4 percent), while people of Surinamese or Turkish origin were less inclined to leave the Netherlands. In most cases values for the urban regions Noord-Holland and Utrecht were relatively low. In Zuid-Holland emigration probabilities vary around the country average. Emigration numbers, however, are difficult to interpret as generally emigration statistics systematically underestimate emigration patterns. If we add net administrative corrections to the emigration numbers, overall emigration probabilities increase by 25 to 70 percent (*Table 2.7*). As the number of corrections differs

Table 2.6: Emigration probabilities for five groups of migrants, the Netherlands, NUTS 2 1995

NUTS 2 region	Antilles	Morocco	Turkey	Surinam	Other developing countries
Groningen	4.56	3.74	1.12	0.78	2.37
Friesland	3.63	2.18	0.44	0.54	1.66
Drenthe	2.52	1.82	2.91	0.83	3.19
Overijssel	4.54	1.75	1.10	0.55	3.21
Gelderland	3.77	1.51	1.07	0.75	2.15
Flevoland	4.99	1.91	0.27	0.53	1.57
Utrecht	3.11	1.08	0.72	0.64	1.85
Noord-Holland	3.35	1.00	0.67	0.45	1.28
Zuid-Holland	4.30	2.12	0.86	0.52	1.81
Zeeland	4.73	1.87	0.43	0.65	1.50
Noord-Brabant	5.22	1.47	0.91	0.54	2.01
Limburg	3.55	2.06	1.19	0.18	1.81
Nederland	4.07	1.55	0.88	0.52	1.82

Table 2.7: Emigration probabilities (including net administrative corrections) for five groups of migrants, the Netherlands, NUTS 2 1995

NUTS 2 region	Antilles	Morocco	Turkey	Surinam	Other developing countries
Groningen	6.51	5.35	1.69	1.21	3.77
Friesland	4.44	1.91	0.88	0.36	2.38
Drenthe	5.03	1.82	4.36	1.66	3.79
Overijssel	4.37	1.75	1.13	0.66	3.49
Gelderland	4.67	1.74	1.25	0.60	2.69
Flevoland	5.16	2.16	1.59	0.83	2.09
Utrecht	4.22	1.68	1.23	0.99	2.82
Noord-Holland	4.46	1.74	1.86	0.95	3.20
Zuid-Holland	5.19	2.59	1.49	0.88	3.21
Zeeland	5.12	1.87	1.08	0.65	2.54
Noord-Brabant	6.63	1.73	1.08	0.80	3.11
Limburg	5.16	2.48	1.69	0.18	2.74
Nederland	5.10	2.05	1.45	0.89	3.09

across regions, the regional pattern of emigration probabilities changes as well. For instance, in Noord-Holland the emigration-plus-correction probability of people of Turkish origin is substantially higher than the country average, while without including the corrections this probability was substantially lower. Due to the small number of observations, nothing meaningful can be said about regional emigration patterns at the NUTS 3 level.

Conclusion

Return migration propensities of migrants increase with the age of entry, and decrease with the number of years of residence. Furthermore, return intentions may differ strongly between various groups of foreign population (here defined by citizenship). Due to measurement problems, however, emigration numbers are difficult to interpret and therefore difficult to use.

2.5 Regional allocation of asylum seekers and asylum migration

Asylum migration is highly regulated. This may have implications for the spatial distribution of asylum migrants. Regional allocation systems largely determine where asylum migrants enter a country. If a spatial allocation system exists which allocates asylum seekers and migrants having obtained asylum to dwellings all over a country, this results in a relatively dispersed spatial pattern of allocation. This is for instance the case in Germany, the Netherlands and Switzerland. In the Netherlands, however, proportionally higher shares of asylum migrants end up in one of the four big cities (Croes, 1995; Croes and Van Huis, 1997). In Austria and Denmark, on the other hand, there is - or at least was - explicitly a link between stocks and flows also in this category of migrants. In Austria, the different Länder were assigned reception quotas which are proportional to their total population and to the number of already residing foreigners in each Land (Wirtén, 1994). In Denmark, efforts are made to ensure that the distribution of asylum seekers over the local authorities is as even as possible. Nevertheless, special consideration is given to family links the refugee may have in the area and to the opportunity for refugees to come into contact with people of their own nationality (Liebaut and Hughes, 1997). In countries without a spatial allocation system, asylum migrants are most likely attracted to the largest urban centres. However, Koser (1997) and Böcker and Havinga (1998), have demonstrated that also in this case destination patterns were influenced by social networks.

A complicating factor here is when, and more importantly where, asylum seekers are registered or counted as immigrants. As such, an asylum seeker is, or becomes, not immediately a migrant. In general, however, at least part of the persons entering a country as asylum seeker will become immigrants at some point in time. The procedures for asylum applicants to become immigrants vary widely between countries. In most EU-countries asylum seekers are included in the immigration statistics if they are registered in the population or aliens register, although the conditions under which this happens vary between countries. In other countries, registration occurs automatically after a certain period in time (Eurostat, 1994). Accomodation on arrival, however, may be limited to a relatively small number of reception centres, while later housing possibilities may be more dispersed over the country. The spatial distribution of asylum immigrants, therefore, will largely depend on the time lag after which asylum seekers are considered as immigrants. Consequently, the moves from initial accomodations to other locations will be included in the internal migration figures in some countries, while they will not be taken into account in other countries. This not only makes comparisons between countries difficult to make, but it may also bias internal migration patterns.

As in the late 1980s and 1990s changes in international migration levels in Europe are strongly determined by asylum migration (Kupiszewski, 1996), information on family related migration following asylum migration may be important as well (Den Dulk and Nicolaas, 1998). Similar to labour migration, asylum migration shows a pattern of chain migration.

Although the destination of the initial group of asylum seekers may often just be accidental, others may follow them to join their family or because they used the same networks and routes as their predecessors to flee from their country. An example of chain migration following asylum migration is the Sikhs in Belgium. In this case, migration is limited to specific regions of origin (India) and destination (Sint Truiden; Böcker and Havinga, 1998). For the Netherlands, Nicolaas (1999) showed that in the early 1990s the number of asylum migrants increased sharply. Nevertheless, the size of family reunification and family formation migration caused by asylum migrants of the main countries of origin is still relatively modest. Considerable differences, however, were found between countries of origin. For instance, for every two asylum migrants from Vietnam one person immigrated for the purpose of family reasons, while for Angola against eight asylum migrants stands only one family migrant. Nicolaas concludes that although estimating future numbers of asylum migrants and their family-reunifying and family-forming migrants is very difficult, it can be expected that in the short run the number of family-related migrants from countries that have recently generated large flows of asylum seekers will increase. Most EU-countries have special regulations on family reunification for asylum seekers. Provisions, may be dependent on refugee status (for instance Convention, humanitarian, or temporary protection), and may vary across countries (Liebaut and Hughes, 1997).

Conclusion

Although asylum migration is highly regulated, the regional allocation of asylum migration may be partly determined by the number of foreigners residing in a region. Therefore, at least in a number of countries an explicit link may exist between stocks and flows of migrants also in the case of asylum migrants. Furthermore, since in recent history international migration trends were strongly affected by asylum migration, it can be expected that in the near future the number of family related migrants generated by these asylum migrants will increase.

3. DETERMINANTS OF REGIONAL PATTERNS OF MIGRANTS

In chapter 2 recently observed regional patterns of migrants were discussed. It was shown that generally migrant populations tend to be largely attracted to a limited number of urban areas and that different migrant populations show different regional patterns. The question addressed in the current chapter is: what factors determine the regional patterns? In section 3.1, the theoretical structure of the relationship between stocks and flows will be discussed. This structure pertains primarily to the linkages between stocks and flows in general, but they apply equally well at the regional level. The main question in section 3.2 is what additional factors account for the regional attractiveness for immigrants to settle in a particular region?

3.1 The relationship between stocks and flows

From an economic point of view, the presence of a migrant population in the destination country reduces moving costs for potential migrants of the same origin. Based on this hypothesis, Carrington *et al.* (1996) developed a model of interregional migration of blacks from the south of the United States to the north in the first half of the 20th century (the so-called Great Migration). Using their theoretical model, they were able to explain to some extent the regional choices of blacks, coming from different southern states, as well as the different timing of different migration groups. Regional choices are affected, not only by proximity to the home region, but also by the size of the migrant network in the destination region. Thus, the idiosyncratic choices of initial labour migrants may have far-reaching effects for the regional choices of later migrant cohorts. This theory also explains why initially young single males (who have low moving costs and a high probability of finding employment) migrate and establish the network for later movers with higher moving costs and lower employment prospects (family members, older workers). Waldorf (1996) provides a more detailed theory of the possible effects of the migrant population on potential immigrants. She distinguishes, following Gurak and Caces (1992), selective and adaptive forces. The selective forces attract migrants from the origin, whereas the adaptive forces affect the likelihood of return migration.

Selectivity is the result of the established social network, and has the effect of providing information to potential migrants, lowering moving costs for newcomers and facilitating new moves through family reunification. With every migrant, the social network increases, thereby propelling new immigration, until the pool of potential migrants is drained and the system becomes saturated. Moreover, as time passes, the average duration time of the migrant stock increases. These compositional changes have profound effects on the selective capabilities of the stock. For instance, newcomers have strong ties to the origin (and hence convey more information abroad), and enhance the immigrant stock's reunification potential, which both have a positive effect on the size of new immigration flows. On the other hand, newcomers are less assimilated, which may have a negative effect on the magnitude of additional immigration flows. As the effects of the compositional changes run in different directions, the total effect may be either positive or negative.

Adaptive functions of the network are important for the likelihood of return migration. The larger the network, the larger its adaptive function (short term assistance, longer term integration, etc.) and the lower is the return propensity of newcomers. Return flows, in turn, affect the composition of the migrant stock, and hence its selective functions. For instance, if

returnees are mainly composed of newcomers, the assimilation potential of the network will hardly be affected (since this is performed by the long-term migrants), but its potential for information channeling and family reunification is lower. However, returnees also have an impact on the origin, and this in turn may affect further migration.

The conclusions of this model for practical usage are the following:

1. The total effect of the network on immigration flows increases as the size of the stock increases, and, as the system matures, the network effect outweighs the effect of external factors (e.g. economic, political);
2. The concept of a migrant network implies that the network consists of members of the same group, with similar ethnicity, origin, language, culture etc.;
3. The marginal effect of the stock decreases with increasing size of the stock, due to saturation effects, and the compositional changes of the stock (for instance the average length of stay) with continuing immigration and selective return migration;
4. The cohort structure of the migrant stock provides information on the migrant-attracting and migrant-retaining capabilities of the stock;
5. Return migration is an important dynamic process that affects the migrant-attracting and retaining capabilities of the remaining stock;
6. The theory does not apply to immigration flows of nationals.

Regarding emigration, the relationship between stocks and flows of foreigners is more straightforward as there is a direct relationship between those foreigners living in a country and those who move away.

Conclusion

One of the main conclusions of this section is that the concept of a migrant network implies that the network consists of members of the same group, i.e. with similar ethnicity, origin, language, culture etc. The implication of this conclusion is that a very detailed breakdown of migrant groups is necessary. How these groups should be defined exactly in operational terms is not clear from the literature.The choice is either according to ethnicity, origin, or nationality (see section 1.2 for more details on this issue). The global distinction between nationals and non-nationals is very crude. Its main advantage is to separate the nationals, for whom the stock-flow theory does not apply, from the non-nationals. The main point of the network concept is that the model should be applied to each group separately. The presence of a large group of migrants originating from, say, Somalia, in a region, is in itself not an attracting factor for migrants from, say, Iran.

Another important conclusion is that the composition of the foreign stock (share of newcomers, average length of stay, and cohort structure) provides information on the migrant-attracting and retaining capabilities of the stock. The implication of this conclusion, however, cannot be followed up easily, since the collection of immigration cohort data, which is necesarry to calculate the average length of stay, is not feasible for most countries and at best only available upon special request in individual countries from the immigration register.

Finally it may be concluded that there is in general no simple linear relationship between the size of the stock and immigration. The duration of stay of the immigrant population, and the selective nature of return migration are important factors that change the direct impact of the size of the network on immigration.

3.2 Additional determinants

Of all demographic components migration is the most volatile. Moreover, it interacts most directly with other domains of society, such as the labour or the housing market, as well as with political and institutional factors. Therefore, non-demographic external characteristics may be useful additional information in predicting the total inflow as well as the regional shares of immigration. Key question here is, what factors, apart from social networks, account for the regional attractiveness for immigrants to settle in a particular region? Since international migration is usually concentrated in a limited number of regions, the explanation of international migration trends may -at least partly- be found in processes in these particular regions.

There is substantial overlap in determinants of the size of the total immigration inflow at the national level and determinants of the immigration share at the regional level. In order to be a relevant discriminating regional factor, however, there should be substantial variation across regions of the level of the variable. Thus factors that vary across time but not across regions are not relevant at the regional level. These include typically political and institutional settings of the country, and generic economic indicators such as the business cycle or the consumers index (although there may be interregional differences in these indicators as well).

Determinants that may vary across regions may be classified in a number of groups:
1. Economic factors (economic structure, labour market, etc.)
2. Housing market (quality, vacancies, price)
3. Metropolitan character (degree of urbanization, infrastructure)
4. Location (border regions, distance to the border)
5. Regional amenities (climate, landscape, etc.)

First of all, traditionally, migration is clearly related to regional differences in economic developments. Immigrants are often attracted to regions of rapid economic growth whereas, conversely, less prosperous regions tend to experience relatively large emigration flows (Fielding, 1993; Blotevogel and King, 1996). The labour market and more specifically the level of unemployment is an important indicator in this respect (see also Van der Gaag and Van Wissen, 1999a, for evidence at the national level).

Developments on the housing market are important as well. In practice, foreigners often occupy the lowest segments of the housing market, that are left vacant by other foreigners or natives leaving the city to return to their country of origin or to suburban or rural locations. In most EU countries the rental sector is the most important for housing of immigrants (Buisman and Muus, 1992). Moreover, within the conurbations immigrants tend to concentrate in inner city areas, because here cheap housing is reasonably easily available (Coleman and Salt, 1992). For London, Paris, and Düsseldorf, White (1993) has demonstrated the significance of housing sectors in creating areas of ethnic minority groups. Different groups of migrants, however, may show different housing preferences. In the case of refugees and asylum seekers, for example, initially housing is often an emergency accommodation. Persons involved in family reunification most often search for a larger dwelling, while persons starting a family behave more as starters of two-person households. Moreover, the longer one has stayed in the host country, the more demands are made on housing and the housing environment (Buisman and Muus, 1992).

The spatial distribution of cheap rental housing explains partly the large concentration of foreigners in metropolitan areas. But large cities offer more than cheap housing: the informal economic sector, opportunities on the labour market, availability of services, education, elderly services, etc. (Crommentuijn, 1997) all play a role that cannot be isolated easily. The net effect of these combined forces make up a large pull factor of urban areas for international migrants.

Another factor of significance is the geographical location with respect to the borders of a country. Border migration is an important phenomenon, especially between countries who are both members of the EU. Here, in principle free movement of people exist, which is often concentrated near the borders of the countries involved.

Finally, specific characteristics of regions, such as landscape or climate may have special pull effects on migrants. Cultural differences too may play a part, like the attitude of the indigenous population regarding newcomers.

In order to understand the role of different factors, analysis of regional differences in background characteristics is needed. A number of researchers have given attention to this topic. Zagórski (1990) formulated and tested a number of hypotheses on the impact of the regional economic structure on regional immigration differences. Disregarding his hypothesis of a relationship between stocks and flows, which is in line with the present discussion on stocks, the positive findings of his research on regional immigration in Australia were the following:

1. The regional economic structure (agriculture, industry and services; 'core' sectors versus 'peripheral' sectors), and the economic strength of the region both play a role in attracting immigrants, with the former of more importance than the latter;
2. Migrants find both work in core sectors and peripheral sectors of the economy;
3. Independent from economic factors, immigration is positively related to the metropolitan character of the region. Related to this is the negative correlation between internal migration and external migration at the regional level;
4. The sectoral mix, the strength of the regional economy and the metropolitan character of the region exert their impact also indirectly through the conditions on the regional labour market. High unemployment implies low immigration and *vice versa*. This hypothesis was not confirmed however. Unemployment did not add much to the explanation of the regional distribution when used jointly with the others;
5. A bundle of socio-economic characteristics of the region (income, socio-economic status etc.) is an important determining factor of the destination of immigration;
6. Different migrant groups have different regional distributions and are affected differently by economic factors.

In another study, Fassmann (1994) showed that the spatial distribution of net migration within Austria is a function of population density and of the foreign population initially present in the region. The concept of net migration, however, is difficult to interpret. The results of an empirical analysis on the inflow component of the guest-worker migration system in Germany, carried out by Waldorf (1996), suggest that network variables have an increasing impact on the attraction of immigrants over time, as the size of the network increases, while the impact of economic factors declines over time. Van der Gaag and Van Wissen (1999a) show that for older immigrant groups in the Netherlands (e.g. Turks, Moroccans) the impact of economic variables on immigration in the period 1985-1996 is less than for more recent

immigrant groups. So, length of stay of the stock is important for assessing the impact of network and external variables on immigration. This is not especially more true for the regional level than for the national level, but it may have additional regional consequences, if duration of stay is different among regions. In that case, as stated above, regional differences might be partly attributable to the migration history in the region. De Jong and Visser (1997) interrelate the regional distribution of net international migration in the countries of the European Economic Area (EEA) with economic opportunities, the existence of social networks and an attractive environment. In this latter respect, especially the favourite climate in the so-called 'sun-belt' regions, like for instance Algarve in Portugal and the Mediterranean regions in France, may attract migrants. Van Wissen and Visser (1998) have modelled international migration flows between the countries of the EEA, and found that between these countries population redistribution was mainly influenced by the existence of networks of migrants, while economic differences between these countries appear to have little impact.

In Van der Gaag and Van Wissen (1999b) the question was addressed which factors account for the regional attractiveness for immigrants to settle in a particular region. In this study, using German data, the following factors were related to the number of foreign immigrants per foreign inhabitant presently living in a region: unemployment; the size of the urban area[1]; the size of the national population; the size of the foreign population; the classification whether a region can be defined as a border region or not (on the west and east respectively); and the internal outmigration rate. The first three variables refer to the regional (economic) environment, while the size of the foreign population refers to the existence of social networks. Border regions are assumed to attract relatively more migrants than other regions, because of cross-border labour and housing markets and the distance decay of information on regional opportunities. Note that the definition of border here is slightly different from that used in section 2.1 because here the degree of urbanization is not a discrete category but a continuous variable. Thus, regions can be both a border region and have a high score on urbanization. The internal outmigration rate refers to the housing market opportunities. It may be hypothesized that migrants are attracted to regions where housing is available; e.g. housing space that is left vacant by internal outmigrants moving to other regions. Thus, a negative relationship might exist between internal outmigration and external immigration (see also a related study by Stillwell *et al.* (1999) on the relationship between regional international and internal migration).

The results of this study indicate the following: Urbanized regions do attract a large number of foreign immigrants, because they are large in size, and have a large foreign population. In relative terms, however (with respect to the resident foreign population), their immigration share is less than proportional. The same is true for regions with a large foreign population in general (irrespective of being an urbanized region or not). They receive a large number of immigrants, because of the size of the foreign population, but in relative terms the share is smaller than proportional. Further, the effect of unemployment is as expected: the higher the unemployment rate, the less attractive the region is for foreign immigration. Moreover, eastern border regions receive relatively more foreign immigrants than other regions, and western border regions relatively less. Of course, after initial settlement, migrants may relocate internally. Finally, the effect of internal migration is not as assumed. The larger the internal outmigration rate, the less attractive the region is for foreign immigration. The housing market substitution hypothesis therefore, does not hold at the NUTS 2 level in Germany.

[1] in km^2; land-use statistics RIVM (National Institute of Public health and the Environment, the Netherlands)

Conclusion

Determinants of the immigration share at the regional level may be classified in five groups: economic factors, housing market variables, metropolitan character, location of a region and regional amenities. Those factors may affect different groups of migrants differently. Moreover, the existence of networks of migrants has a significant impact on the attraction of immigrants. A study for Germany showed that regions with a large foreign population in general, receive a large number of immigrants. In relative terms (with respect to the resident foreign population), the share is smaller than proportional.

4. PROJECTION MODELS FOR INTERNATIONAL MIGRATION AT THE SUBNATIONAL LEVEL USING STOCKS AND FLOWS: METHODOLOGICAL ISSUES

In this chapter attention is focussed on the methodological issues of projecting the regional allocation of migration taking into account the stock of foreign residents. Different types of models will be discussed and evaluated in section 4.1. Current practice in Europe concerning the use of linkages between stocks and flows of foreign population in regional projection models is subject of section 4.2. In sections 4.3-4.5 we will deal with a number of methodological issues around projection models for regional emigration and immigration involving the size of the regional population (stock).

4.1 Types of regional projection models for international migration

International migration is, from a methodological point of view, a difficult component. In the standard cohort-component projection model the components birth and death are modelled as events that occur in a population under exposure of risk of experiencing these events. An occurrence-exposure rate can be calculated by taking the number of events that occurred in the unit time interval and dividing it by the total length of exposure time experienced by the population. In the standard cohort-component model these rates are calculated for each age and sex-combination. Emigration can be treated similarly, but immigration does not fit in this framework. The population at risk is very large and heterogeneous (i.e. the population living in the rest of the world) and therefore the risk of immigration into the country is very small. Calculating rates based on these occurrence-exposure intensities will in general not be feasible. Instead, other methods are usually employed. Basically there are three methods for projecting international migration (Van Imhoff *et al.*, 1994a):

1. Models that produce estimates of net migration totals;
2. Models that produce separate estimates of emigration and immigration totals;
3. Models that produce separate estimates of emigration rates (by age and sex), and immigration totals.

Net migration, and emi- and immigration totals are usually broken down into age- and sex-specific categories using a sex-specific age profile. In practice it is possible that the projection model uses net migration figures, but the underlying migration assumptions are based on separate immi- and emigration hypotheses and models.

In regional population projections the same distinction applies, and usually the same choice of method is made at the national and the regional level. In addition, a basic distinction is made between regional models with and without consistency with national projections. Consistency may be achieved in various ways (Van Imhoff *et al.*, 1994a, p. 63):

1. Bottom-up: the national projection is the aggregate (over all regions) of the regional projections;
2. Top-down: allocate the results of the national projections to the regions, using an allocation rule;
3. Mixed: adjust the regional results in such a way that they add up to the national total.

The method may be different for each component in the projection model. In particular, net migration and emi- or immigration totals are generally treated in a top-down framework, where the national total is distributed over the regions. Regional emigration rates may be subject to a mixed approach where projected regional emigration totals are scaled proportionally to add up to the national total.

4.2 Current practice in European countries

This section gives a partial overview of current practice of dealing with foreign stocks and international migration in regional projection models. In Van Imhoff *et al.* (1994a, and updated in Van der Gaag *et al.* 1997) an overview of current practice in regional projection models was given, including details on the treatment of international migration. Of all 18 countries (EU plus Liechtenstein, Norway and Switzerland) only Belgium reported using foreign stocks in the regional international migration component, by using nationality-specific emigration rates. These reports reflects practice in regional projection making until the early nineties, and it does not completely capture the changes that might have been made in regional projection models in the nineties as a consequence of the growing importance of the international migration component in subnational projections. For the present overview, a small survey was taken in six EU countries: Austria, Germany, England, Italy, Northern Ireland and the Netherlands. Therefore, this overview presents only current practice in a subset of EU countries. According to the 1994 overview, among these countries the most sophisticated regional projection models in the EU can be found. The only exception here is Belgium, that uses a complete multiregional model for regional projections, but is not included in this overview. The questionnaire was much smaller than the 1994 and 1997 versions, and focuses in particular on the role of migration groups and migration stocks in subnational projections of international migration. Positive responses were obtained from all six countries. This section gives an overview of the results. In some places information from the 1994 and 1997 questionnaires were used as well. We will summarise our main findings around a number of key issues of the problem.

Regional projection methodology of international migration: some key issues

Aggregation of migration components
Northern Ireland uses only net total migration for its regions, which is the sum of internal and external migration. In Austria immigration and emigration are treated separately in the assumptions, but this results in a net migration figure in the model. All other countries specify immigration and emigration separately in their model. According to the 1994 overview, the majority of the not-included countries do not distinguish between internal and external migration and calculate only net total migration.

Rates or numbers
In the standard multiregional model emigration is calculated using rates, and immigration using numbers, which are allocated over the regions. This is practised in the Netherlands, Italy, England and Germany. According to the 1994 or 1997 overview, this is also practice in Belgium. All other countries work with gross immi- and emigration numbers, or net migration numbers.

Top-down versus bottom-up
The predominant practice for models using net migration is a top-down fashion. The projected national total net migration figure is distributed over the regions. By definition this implies consistency between national and subnational level. In Belgium, the Netherlands, England and Germany emigration is treated in a mixed approach: regional projected emigration (using rates) are scaled proportionately to achieve consistency with the national emigration estimate. Immigration, if present in the model, is allocated using a top-down approach where the national projected number is allocated over the regions using region-specific shares.

Age- and sex-distributions of migration
In all countries except Germany, the Netherlands and Belgium age- and sex distributions are imposed on the projected total numbers of (immi, emi, or net) migrants, for instance by using historical profiles, or model migration schedules (England) . In the Netherlands, Italy and Belgium the structure of the multiregional model implies that the projections are age- and sex-specific. For instance, in the Netherlands six age categories are distinguished. In Germany the model is age but not gender specific. At the Länder-level six age groups are distinguished. Estimates for smaller age categories are obtained by using a 1-year age profile.

Groups of migrants
The Netherlands classifies international migration according to nationality. Here, nine categories are distinguished: NL, EU, Turkey, Morocco, Surinam+Antilles, other Europe, Africa+Asia+ South-America, Indonesia, other. Germany uses the total number of non-native population in the region, to estimate the regional share of the total number of emigrants. According to the 1994 survey, Belgium uses the nationality dimension in its emigration projection module. England makes a distinction between three groups of international migration: within the UK, Ireland, and the rest of the world. In addition, asylum migration is distinguished at the regional level. None of the other countries distinguishes between groups of migrants in their model. Nevertheless, a number of countries mention the Delphi procedure in making assumptions for international migration. Therefore, it is possible that in the assumption making process more information is used, such as citizenship, country of origin, asylum versus other migration, and so on. In Germany for instance, in formulating immigration assumptions a distinction is made between a number of large world regions. It is not known, however, whether this type of information is also used when making regional migration assumptions. The evidence so far leads one to the tentative conclusion that in most countries regional migration assumptions other than using fixed historical figures or trends are hardly made at all, and that using information on groups of migrants in assumption making is even more remote from current practice.

Regional foreign stocks as predictors
Based on the limited use of the migrant group dimension in regional projections, the size of the foreign stock is used in projections in only a very limited number of countries. All countries that use net migration base the allocation on observed fixed historical shares, or trend extrapolations of observed numbers of net migration. Only in Belgium and the Netherlands is the stock used in the emigration component. In Belgium and the Netherlands group-specific emigration rates are applied to the stock of non-native population (by groups of nationality). In England, 1991 census information on regional distribution by country of birth is used in the regional allocation of asylum migration. None of the other countries that distinguish immigration in the model uses the foreign stock to project the regional shares of total immigrants. Instead, immigration shares are based on historical figures, or immigration factors derived from immigration numbers. If these historical shares or factors of non-native

immigrants cover a time series of sufficient length, as in the Netherlands, the difference with foreign stocks may be small, since the stock is the cumulative effect of immigration and the other demographic components that change the size and composition of the non-native population. The German situation is a special case. Since historical migration figures of Eastern Germany have little value for projections, an estimate of the regional share in immigration and emigration had to be made for all eastern regions (Bucher and Gatzweiler, 1992).These estimates were based on regressions of immigration on a number of exogenous regional variables, and estimated using all West-German regions. In these regressions, the following variables were used: gross regional product, population density, labour market variables, and housing market variables. Surprisingly, no stock variables were used.

Conclusion

Based on this overview of current practice it can be concluded that at present projection models, with a few exceptions, do not distinguish between groups of migrants. In many applications, net total migration (internal plus external) is used, which is the most basic form of the migration component. In the limited number of cases where nationality is important (Belgium and the Netherlands) it is used as the population at risk of emigration using group-specific emigration rates. in England a basic distinction is made between UK, Irish and rest of the world in international migration. However, this classification does not apply to stocks. In allocating asylum migration over the regions, regional shares by country of birth are used. In Belgium and the Netherlands groups of nationality are distinguished.

In formulating international migration assumptions at the regional level none of the countries reported in the present or the 1994 survey that information about groups of migrants and migrant stocks is used in the regionalisation of international migration. In general, as was already concluded in the 1994 survey, assumptions about the regional dimension of this component are absent, or based on general assumptions about future regional-economic development.

Therefore, it may be concluded, that the potential of using the dimension of country of citizenship in regional projections is still largely unexplored.

4.3 Regional emigration and stocks

Projecting regional emigration, as stated above, may be done in two ways:

1. Projecting national emigration totals, and distributing this total number over the regions of sub-populations (top-down);
2. Using regional-specific emigration rates. These rates may be subject to scaling in order to guarantee consistency with the national level (bottom-up or mixed).

A major advantage of using emigration rates is that emigration will automatically be proportional to the size of the (sub)population. This link is not guaranteed in projections of total numbers of emigrants. Therefore, in general, emigration rates should be used, not numbers. Nevertheless, the difference between both methods need not be very large. Disregarding age structure effects, using homogeneous emigration rates across regions in method (2) and using the relative size of the regional population stock as the distributing

factor in method (1) will yield the same result. However, the added value of using rates at the regional level is precisely the possibility of specifying regional-specific values.

Projecting regional emigration using rates is a relatively simple procedure. In order to calculate an emigration rate, (an estimate of) the regional number of emigration events as well as the exposure to emigration is required. A breakdown of these rates by age and sex is necessary but this may be estimated separately from national, or at least grouped regional data, since the number of observations may be quite small for estimating individual regional age- and sex-specific rates. In this respect, it may be helpful to fit model migration schedules to migration rates in broad age groups and to use the fitted curve as an interpolation device to obtain 1-year age group rates. This procedure, for instance, is followed in Germany. The exposure can only be calculated taking into account the size of the regional stock of the sub-population. Depending on the definition of the sub-population this may in itself be difficult, but it is a separate issue apart from the specification of the emigration model. In conclusion, when projecting regional emigration by using rates, the size of the stock of the regional (sub)population is included in the method by definition. Furthermore, emigration projections could in principle be improved by using a migration cohort approach, which implies distinguishing immigration stocks by year of entry.

4.4 Regional immigration and stocks

Regional immigration is generally treated in a top-down framework, where the projected national total immigration (by age and sex) is allocated over the regions, using regional shares. There are basically three methods of calculating immigration shares. These may be characterized by the type of information they require:

1. Historical shares: based on observed immigration flows over the regions in previous years;
2. Regional stocks: based on the observed distribution of the (sub)population under study over the regions;
3. Non-demographic variables: based on a regression-type equation that relates observed characteristics of the regions to observed regional immigration flows.

In practice, mixed or hybrid forms do exist. In the next subsections we will discuss the structure of regional immigration models of stocks and flows.

Projection models

1. Historical shares model

The 'standard' or most common approach in allocating immigration to regions is using historical information on the destination choices of migrants. The simplest form is to use the most recent regional shares, Q_r or a combination of shares of recent years, and apply these to the projection:

$$Q_r(t) = Im_r(t\text{-}1) / Im_+(t\text{-}1) \qquad (1)$$

where $Q_r(t)$ is the regional share in immigration of region r at time t, $Im_r(t\text{-}1)$ is the size of the immigration flow into r at time $t\text{-}1$, and $Im_+(t\text{-}1)$ is the total immigration at the national level at $t\text{-}1$. Often, not only information from time $t\text{-}1$ is used but from a range of years $t\text{-}u$, for

$u=1,..,U \leq t$ (for instance, a weighted average of previous years). An example of the historical share approach is given by Edmonston and Passel (1992), who apply it to different ethnic immigrant groups in the United States, but in practice in many European countries this is the common procedure (Van Imhoff *et al.*, 1994a), although in general immigrants are not broken down into ethnicity/nationality/origin. This method is also applied in the most recent regional population scenarios of Eurostat (De Jong and Visser, 1997). If age- and sex-specific information is available, the shares can be age-and sex-specific as well. The method of historical shares suffers from a number of drawbacks:

1. There is no direct theoretical foundation, other than 'inertia of the system' (today's migration pattern is very similar to yesterday's);
2. The historical shares are fixed, whereas from a theoretical point of view the shares may change as a result of changes in the size and composition of the migrant stock through ageing, return migration and internal migration, and the influence of exogenous variables (political, economic).

What makes the historical shares approach so popular is of course the limited amount of information necessary. Information from one or a few years of regional immigration is sufficient. If more information on stocks and external variables is available, the method should not be used for non-nationals. In the absence of a clear theoretical framework for returning nationals the 'inertia theory' may be applied and therefore the method may be applicable to this group.

2. Mixed stocks and historical shares

One step towards a method incorporating stocks is a mixed approach of stocks and historical flows. This method can be applied in various ways. The method is essentially expressed in the following equation:

$$Q_r(t) = (S_r(t) / S_+(t)) * F_r(t-1) \qquad (2a)$$

where $Q_r(t)$ is, as before, the regional share of immigrants in region r at time t, $S_r(t)$ is the size of the stock in region r at the beginning of the projection period, $S_+(t)$ is the size of the stock at the national level at time t, and $F_r(t-1)$ is a regional immigration factor, that specifies the deviation of the immigration shares, based on observed flows at time $t-1$, from the proportional allocation according to the shares of the stock. Thus,

$$F_r(t-1) = [\, Im_r(t-1) / Im_+(t-1)] / [\, S_r(t-1) / S_+(t-1)\,] \qquad (2b)$$

When applied to total immigration, the stock variable S pertains to the total population or related quantity. For instance, in the Netherlands in the early nineties a method was applied where S pertains to the housing stock, and F is a regional factor that specifies how the recent immigration pattern deviates from the proportional allocation according to the housing stock (Leering and Den Otter, 1992). Equivalently, the total population could have been used for S. The necessary input for this approach differs only from the historical shares method by S_r (the total population) by region which is always available. If there is no breakdown of migration and population according to ethnicity/nationality/origin, this model (2) using total population as the indicator S is to be preferred over the historical share model (1) since it includes a crude indicator of stocks. If the relationship between stocks and flows is perfectly proportional, then it holds that $F=1$ for all regions. In general, however, the factor is different from 1, as shown for instance in the analyses presented in chapter 2 of this report.

3. Non-linear stocks

Model (2) still does not capture the complete mechanisms implied by the theory. F_r is fixed and therefore the non-proportionality of each region is constant over time. If, due to saturation effects, the law of diminishing marginal increase of attracting and retaining power applies, F should be made dependent on the size of the stock. This method was applied in Huisman and Van Wissen (1998) where the following specification was applied in a regional projection model for the Netherlands:

$$Q_r(t) = S_r(t)^{\alpha} / \Sigma_j S_j(t)^{\alpha} \qquad (3)$$

Σ_j is the summation over all regions, $j = 1, .., R$, such that $\Sigma_j Q_j = 1$. The power function S^{α} makes the non-proportionality of each region dependent on the size of the stock. If $\alpha < 1$, then larger regions receive a less than proportional share of immigrants, if $\alpha > 1$ they receive a more than proportional share. According to the theory, α should in general be smaller than 1, since saturation effects are likely to exist at the regional level. We will come back to this issue in the next section, where we estimate the parameter of this model using data for the Netherlands.

Since S is endogenous in the projection model $Q_r(t)$ is endogenous as well, and captures the effects of the size of the migrant network, as well as some of the non-linear (i.e. saturation) effects.

This model was applied in the Netherlands (Huisman and Van Wissen, 1998) in regional projections of the population according to origin. The experience here showed that care should be taken in applying the method for regions with a very small stock. If α is smaller than 1, very small regions receive relatively large shares of immigrants. For one region, having a size of only a fraction of the size of the largest urban regions, the relative impact of the projected large share of immigration turned out to be unrealistically high.

The coefficient α may be estimated using generalized linear models (GLM's) as implemented, for instance in the program GLIM (Nelder & Wedderburn, 1972), and specifying the model in log-linear form. However, estimated standard errors are too small, since the underlying assumption of the Poisson distribution and hence equality of mean and variance does not apply. However, methods exist to correct for overdispersion in this specification (for an application of this correction method, see Van Wissen and Visser, 1998).

4. Including additional variables

In chapter 3 the necessity and potential of using external variables to a projection model for regional shares was discussed. External variables may be employed usefully in projection models only if these variables itself can be predicted with a high level of accuracy. For instance, unemployment may be an important indicator of regional shares, but the problem of predicting the future level of unemployment is as large as that of foreign immigration. These types of variables may be useful in population scenarios, where alternative economic developments are assumed and their consequences for population growth. Urbanization variables, and other highly predictable characteristics of the regions may in principle be useful indicators. However, the net effect of static variables on regional shares is also captured by specifying the non-linear relationship between stocks and flows. Therefore, in projecting models, the usefulness of external factors is limited, and restricted to time-varying but predictable variables. Nevertheless, in regional immigration scenarios these external variables are highly necessary because it increases the transparancy of the assumptions used (which is

in line with Rees *et al.*'s (1999) recommendation about improving migration projections by incorporating non-demographic variables).

The functional form of a model using stocks, fixed historical shares and additional external variables is an extension of model (3). In a loglinear form this model has the following form:

$$ln\ Im_r(t) = \alpha\ ln\ S_r(t)\ + \boldsymbol{X}_r(t)\ \boldsymbol{\beta} \tag{4a}$$

where $\boldsymbol{X}_r(t)$ is a vector of external variables for region r with values pertaining to the beginning of the projection period ($1.1.t$), and $\boldsymbol{\beta}$ is a vector of coefficients to be estimated, as well as the coefficients α. Equation (4a) turns out to be equivalent to the multinomial logit model for grouped data:

$$Q_r(t) = \frac{S_r^{\alpha}(t)\exp[\boldsymbol{X}_r(t)\boldsymbol{\beta}]}{\sum_{j=1}^{R} S_j^{\alpha}(t)\exp[\boldsymbol{X}_j(t)\boldsymbol{\beta}]} \tag{4b}$$

A particular application of model (4) is the use of internal migration variables as predictors for regional immigration. This model is based on the assumption that internal and external migrants compete for the same houses in a region. Negative net internal migration leave dwelling space open which makes immigration more attractive, while positive net internal migration has the opposite effect. This assumption is consistent with the 'pull-hypothesis' in the debate about the relationship between internal and international migration. The alternative hypothesis, that international migration pushes internal migrants out of a region is outside the scope of this report, but is taken up by Stillwell *et al.* (1999) in their parallel study on the linkages between internal and international migration at the regional level.

In the following section we will test the four models presented here using data from the Netherlands in the years 1992 and 1995.

4.5 An empirical test of alternative models for regional allocation of immigration

Data used

The models presented in the previous section were subject of a test using data for the Netherlands from 1992 and 1995. These data were used in two regional projections of the non-national population in the Netherlands (Van Imhoff *et al.*, 1994b, Huisman and Van Wissen, 1998). Since these data were collected for another purpose they do not conform completely to the requirements for the present test. What is required is a breakdown of the international immigration flows and resident population according to region r, and immigrant group g. The exact definition of these immigrant groups is a matter of choice: according to nationality, country of birth, origin or some other definition of ethnicity. Unfortunately, the data in 1992 and 1995 are different in three important respects. First, different groups of migrants were taken into account. The only groups for which we had data that were comparable are: Turkey, Morocco and Surinam. Second, in 1992 a regional projection was made for the regional level of the RBA ('Regionaal Bestuur voor de Arbeidsvoorziening'),

which are labour market regions based on the Employment Exchange Districts in the Netherlands. In 1995 data were collected at the NUTS 3 level of the COROP regions. The RBA level is not consistent with either the NUTS 2 or the NUTS 3 classification.

The third difference between both datasets was the different definitions that were used for migrant groups. Since 1995 country of origin is used to define ethnic groups in the population. Country of origin is defined as the country of birth of the person. If the person is born in the Netherlands, the country of birth of his or her parents is the designating criterion. In 1992 this definition was not known, and a slightly other definition was used, that also involves nationality. Fortunately, the difference with the 1995 definition is small in practice, but only stocks could be defined in this manner; flows were only available by country of citizenship in 1992. Therefore, we had to work with immigration data according to nationality in 1992 and according to origin in 1995. A comparison of the stocks defined in terms of country of citizenship and in terms of country of origin at the RBA level (1992) was possible. *Figure 4.1* shows the relationship between both definitions for three groups of immigrants: Turks, Moroccans and Surinamese. The correlation between both variables is 0.995, 0.995 and 0.976 respectively. For Turks and Moroccans there is a very close one-to-one relationship between both definitions. For Surinamese the numbers are very different. For instance, there are three regions ('Drenthe', 'Het Gooi en Vechtstreek', and 'Westelijk Noord-Brabant') with no Surinamese inhabitants at all as indicated by country of citizenship, while according to the country of origin definition there were more than thousand Surinamese. This difference is due to the large number of persons of Surinamese origin, who obtained Netherlands citizenship in the seventies after the gaining of independence of Surinam, a former colony of the Netherlands. In spite of this difference, there is still a strong linear relationship. An important conclusion may be drawn from these relationships: there is hardly any regional factor in the relationship between both definitions, although for larger regions the size of the population according to origin is relatively slightly larger. Based on these findings, we decided to use nationality in 1992 and origin in 1995.

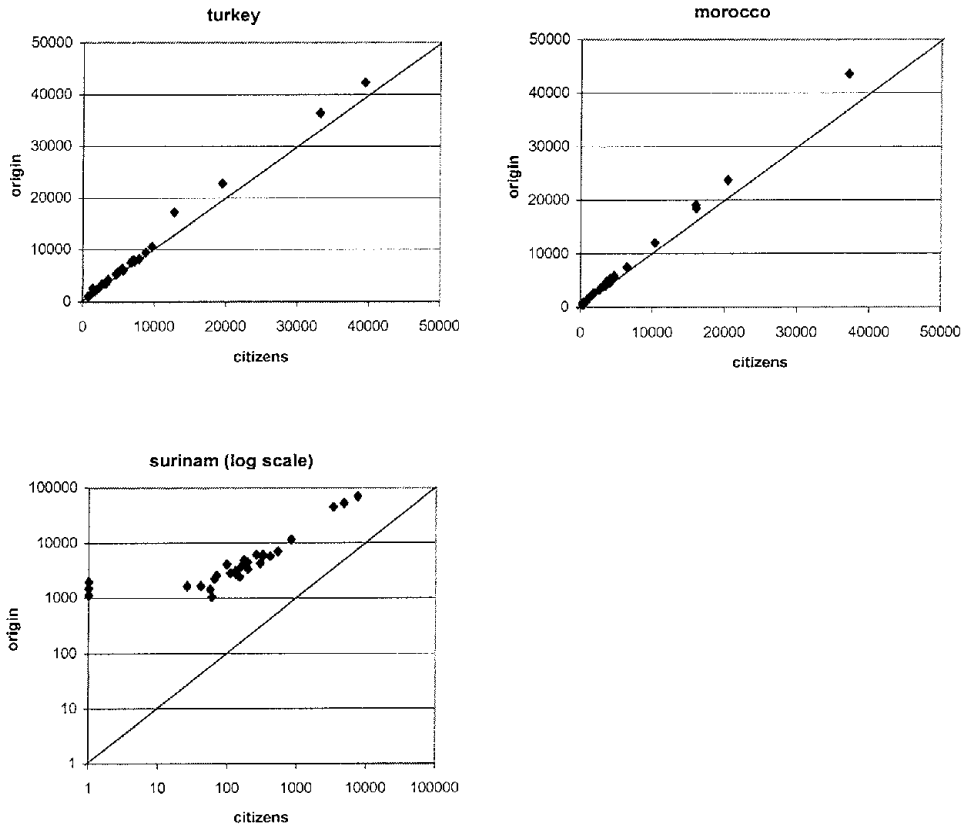
Models estimated

Models (3) and (4) contain parameters to be estimated from observed immigration flows. We estimated the models presented in the previous section using data from 1992, and used these results to predict the regional pattern of immigration in 1995, for three migrant groups, and the aggregate of these three groups. Following Rees and Kupiszewski's recommendations about the optimal spatial scale of regional projections (Rees and Kupiszewski, 1999) we estimated these models and made predictions both at the NUTS 2 and the NUTS 3 level.

We estimated model (4) in three variants, that vary according to the exogenous information used: (4.1) using net internal migration, (4.2) using internal outmigration, and (4.3) using the log of internal outmigration. The models were specified and estimated in GLIM 4.0 as log-linear models. The model fit is estimated as the deviance, which is equal to the likelihood ratio test. A pseudo-R^2, denoted R^{*2}, may be calculated by comparing the deviance of the chosen model $D(m^*)$ with the deviance of the 0-model (intercept only):

$$R^{*2} = 1 - \frac{D(m^*)}{D(0)} \qquad (5)$$

Figure 4.1 *The relationship between the size of the population stock of three groups of immigrants in RBA regions in 1992: Turks, Moroccans and Surinamese, by country of citizenship and country of origin (source: Statistics Netherlands).*



In *Table 4.1* the results of the estimation at the NUTS 2 level are presented, in *Table 4.2* the NUTS 3 results are presented. A number of remarks can be made here:

1. At the NUTS 2 level the models for individual nationalities perform marginally better than the model with the three groups pooled. At the NUTS 3 level this is also true, with the exception of the estimation results of Turkish immigration, which shows a worse fit than the aggregate group;
2. In general, NUTS 2 models perform slightly better than models at the NUTS 3 level. However, the difference in the degrees of freedom has not been taken into account here;
3. The coefficient of the stock is not necessarily smaller than 1. On the contrary, larger than 1 values are very common. This does not indicate the existence of saturation effects at the regional level. However, in Huisman and Van Wissen (1998) model (3) was estimated for the same groups plus Antilles and the group "Other developing countries" (by origin, i.e. country of birth and/or county of birth of one of the parents) using data pertaining to 1995, and here all but one coefficient turned out to be smaller than 1. It appears again therefore that the pattern of regional immigration has changed in the first half of the nineties (see also section 2.3);

Table 4.1 Estimation results at the NUTS 2 level

	C Constant	α stock	β 4.1= net mig 4.2= outmig 4.3= log outmig	Deviance	R^{*2}
Turkey					
0-model				11442	
Model 3	**-3.55**	**1.03**	-	359.6	0.969
Model 4.1	**-1.25**	**0.93**	**-0.051**	274.8	0.976
Model 4.2	**-1.84**	**0.82**	0.0064	288.3	0.975
Model 4.3	**-3.16**	**0.87**	**0.31**	334.1	0.971
Morocco					
0-model				10781	
Model 3	**-3.09**	**1.00**	-	286.7	0.973
Model 4.1	**-2.47**	**0.93**	-0.033	252.1	0.977
Model 4.2	**-3.34**	**1.04**	**-0.0012**	282.7	0.974
Model 4.3	**-3.15**	**1.05**	**-0.096**	281.6	0.974
Surinam					
0-model				14402	
Model 3	**-0.34**	**0.92**		160.6	0.989
Model 4.1	**0.27**	**0.83**	**0.058**	98.5	0.993
Model 4.2	**0.23**	**0.77**	**0.0070**	63.3	0.996
Model 4.3	**-0.88**	**0.80**	**0.349**	80.9	0.994
Turkey+Morocco+Surinam					
0-model				34413	
Model 3	**-4.04**	**1.11**		1346.4	0.961
Model 4.1	**-2.49**	**0.96**	**-0.068**	991.6	0.971
Model 4.2	**-2.78**	**0.96**	**0.0044**	1267.9	0.963
Model 4.3	**-4.22**	**1.17**	**-0.118**	1337.5	0.961

Bold numbers denote significant coefficient values (p>95% one-tailed)

Table 4.2 Estimation results at the NUTS 3 level

	C Constant	α stock	β 4.1= net mig 4.2= outmig 4.3= log outmig	Deviance	R^{*2}
Turkey					
0-model				14512	
Model 3	**-3.92**	**1.08**	-	1150.0	0.804
Model 4.1	**-4.21**	**1.11**	**0.033**	1133.2	0.922
Model 4.2	**-3.09**	**0.96**	0.0091	1101.4	0.924
Model 4.3	**-5.38**	**0.92**	**0.287**	1042.4	0.928
Morocco					
0-model				15252	
Model 3	**-3.09**	**1.00**	-	581.9	0.925
Model 4.1	**-3.45**	**1.04**	-0.013	577.9	0.962
Model 4.2	**-3.21**	**1.00**	**0.0040**	575.3	0.962
Model 4.3	**-4.17**	**0.99**	**0.112**	577.9	0.982
Surinam					
0-model				20855	
Model 3	**-0.31**	**0.90**		793.2	0.972
Model 4.1	**-0.17**	**0.88**	**-0.045**	749.5	0.964
Model 4.2	**-0.39**	**0.93**	**-0.0043**	785.3	0.962
Model 4.3	**-0.93**	**0.88**	**0.077**	789.1	0.962
Turkey+Morocco+Surinam					
0-model				47008	
Model 3	**-4.47**	**1.16**		2851.2	0.983
Model 4.1	**-4.41**	**1.16**	**-0.009**	2846.5	0.939
Model 4.2	**-5.01**	**1.23**	**-0.0055**	2822.7	0.940
Model 4.3	**-4.74**	**1.13**	**0.055**	2845.0	0.939

Bold numbers denote significant coefficient values (p>95% one-tailed)

4. The coefficient of the net internal migration variable is in three of the four times negative at the NUTS 2 and the NUTS 3 level, as expected. The other specifications (outmigration or log outmigration) show negative as well as positive values;
5. The differences between the fit of model (3) and any of the models (4.1 to 4.3) at the NUTS 2 level is sufficiently large to warrant inclusion of internal migration as a predictor, especially for immigration from Turkey, Surinam and for the pooled group of immigrants. With the exception of immigration from Surinam, the best specification is net internal migration as a predictor. At the NUTS 3 level the inclusion of internal migration as a predictor is not justified. Solely for immigration from Morocco model 4.1 performs better than model 3 and the coefficient of the net internal migration variable is negative. In all other cases either the coefficient of the internal migration variable is positive or the models 4.1-4.3 perform worse than model 3.

Models validated

In this subsection we compare the predicted regional immigration pattern for the Netherlands for 1995 with the observed pattern, using four immigrant groups: (1) Turkey, (2) Morocco, (3) Surinam, and (4) the three groups pooled into one. We tested results at both the NUTS 2 (province) and the NUTS 3 (COROP) level. In line with the previous subsection, four different models were tested for each group: (1) historical immigration shares; (2) stocks shares plus historical regional factors; (3) stocks function; and (4) stocks plus internal migration. Since the exact relationship between internal and external migration is not known, we tested different variants of model (4): (4a) net internal migration; (4b) internal outmigration; and (4c) log internal outmigration.

The closeness of the fit between predictions and observed distribution is the Relative Absolute Error (RAE), which is calculated as:

(6)

$$RAE = \frac{\sum_i |Obs_i - Exp_i|}{\sum_i Obs_i}$$

where Obs_i is the observed number of immigrants in region i, and Exp_i is the expected number as predicted by the model. This statistic generally has values between 0 (perfect fit) and 1 (total absolute error is equal to total observed inflow: bad fit), but larger values than 1 are also possible, which indicates an extremely bad prediction.

Table 4.3 presents results for the three groups pooled into one group.

Table 4.3: Prediction results for Turkey+Morocco+Surinam pooled into one group of immigrants

Model type	RAE	
	NUTS 2 (Province)	NUTS 3 (COROP)
Model 1	0.29	0.32
Model 2	0.25	0.45
Model 3	0.20	0.34
Model 4a: net internal mig.	0.06	0.34
Model 4b: Internal outmig.	0.09	0.34
Model 4c: log internal outmig.	0.24	0.34

The results for the pooled group indicate the following:

1. RAE statistics range between 0.06 and 0.29 for the NUTS 2 level and 0.32 and 0.45 for the NUTS 3 level. Clearly, the NUTS 2 level shows a better fit for all models;
2. At the NUTS 2 level there is a marked improvement when going from model 1 to model 4 (with the exception of model 4c). This is not the case at the NUTS 3 level;
3. Net internal migration has the highest predictive value compared to outmigration or log outmigration at the NUTS 2 level.

Next, we present results for each of the three groups separately. *Table 4.4* shows the results for immigration of Turks. The results are as follows:

1. RAE is between 0.03 and 0.38 for NUTS 2 and 0.16 and 0.34 for the NUTS 3 level. In all cases but model (1) the results are better at the NUTS 2 level.
2. Results for Turks are almost always (except for model (1)) better than for the aggregate group of foreign citizens;
3. Again there is an increase in model fit when moving from model 1 to model 4. Here, the improvement is also present at the NUTS 3 level;
4. The model with net internal migration gives the best fit at both spatial levels, although at the NUTS 3 level there is no difference between model (3) and (4a).

Table 4.4 Prediction results for Turks immigration

Model type	RAE	
	NUTS 2 (Province)	NUTS 3 (COROP)
Model 1	0.38	0.34
Model 2	0.22	0.33
Model 3	0.07	0.16
Model 4a: net internal mig.	0.03	0.16
Model 4b: Internal outmig.	0.07	0.19
Model 4c: log internal outmig.	0.14	0.19

The results for Moroccans are highly comparable to Turks immigration (see *Table 4.5*). Again, model (4a) is better than all other models at the NUTS 2 level. At the NUTS 3 level model (3), (4a) and (4c) perform equally well, but still markedly worse than at the NUTS 2 level.

Table 4.5 Prediction results for Moroccan immigration

Model type	RAE	
	NUTS 2 (Province)	NUTS 3 (COROP)
Model 1	0.27	0.31
Model 2	0.20	0.29
Model 3	0.11	0.21
Model 4a: net internal mig.	0.06	0.21
Model 4b: Internal outmig.	0.14	0.22
Model 4c: log internal outmig.	0.16	0.21

The results for Surinamese immigration are somewhat different (*Table 4.6*). Recall that in this case the difference between the definition according to citizenship and origin is largest, because most persons from Surinam origin living in the Netherlands are Dutch citizens. The major distinction with the results of Turks and Moroccans at the NUTS 2 level is that here internal migration is of no importance in explaining international migration. At the NUTS 3 level, however, the models including net internal migration or internal outmigration perform best.

Table 4.6 Prediction results for Surinamese immigration

Model type	RAE	
	NUTS 2 (Province)	NUTS 3 (COROP)
Model 1	0.16	0.27
Model 2	0.13	0.42
Model 3	0.03	0.13
Model 4a: net internal mig.	0.15	0.07
Model 4b: Internal outmig.	0.20	0.06
Model 4c: log internal outmig.	0.17	0.27

Conclusion

Overall, from the test of using 1992 data to predict the 1995 spatial distribution of immigration we may conclude:

1. The results at the NUTS 2 level are almost always better than at the NUTS 3 level. The best results at the NUTS 2 level indicate that the relative absolute error is less than 10 percent. At the NUTS 3 level this percentage differs much more across migration groups but is generally somewhat higher;
2. The results for individual migrant groups are better than for the aggregate of the three groups. Clearly, the process is not homogeneous across migrant groups;
3. In general the results of the models increase with increasing complexity of the models, (i.e. when moving from model (1) to model (4)). Model (4a) using a multinomial logit function of stocks at the beginning of the projection period in combination with net internal migration generally gives the best predictive results of all tested models;
4. It turns out that the spatial distribution of migrants and migration by citizenship is a good predictor of the spatial distribution of immigration by origin;

5. Net internal migration may be used as an additional predictor of immigration. Note however, that we have not looked into the direction of the causality, viz. the possibility of a reverse relationship in which internal migration is predicted by immigration. This issue is taken up in a parallel research project by Stillwell *et al.* (1999).

5. ASSESSMENT AND EVALUATION OF THE EUROSTAT DATABASE ON STOCKS AND FLOWS

As shown in the previous chapters migrant populations as well as immigrants are largely attracted to just a few, often urban, regions. For Germany and the Netherlands a clear relationship was found between regional stocks and flows of non-nationals, and different migrant populations in the Netherlands showed different regional patterns. In theory therefore, assumptions on regional migration patterns could be improved by linking stocks and flows of foreign population for different migrant groups separately. To do so in practice, however, a detailed regional database on stocks and flows of foreign population is needed. Point of departure for the current study were the Eurostat databases accumulated in New Cronos. So far, analyses have been carried out for a restricted number of countries only, and not all regional data available at Eurostat have been used. In the current chapter further possibilities and constraints of Eurostat's regional databases on stocks and flows of international migrants will be discussed. Concerning the database on migration flows, an important drawback is that only total flows are available and no indication is given of citizenship, i.e. no distinction could be made between nationals and non-nationals, not to mention a more detailed classification by different nationalities. In order to study the relationship between stocks and flows of international migration, however, this information seems indispensable. Therefore it will be evaluated too whether additional information by citizenship is available through other sources but Eurostat.

In general, Eurostat has collected data on stocks and flows of international migration at the regional NUTS 2 level. Accordingly, in our evaluation of data availability, we focus on data at the NUTS 2 level. As the NUTS classification is made up of several hierarchical levels, NUTS 2 can be calculated wherever a lower level breakdown exists. In some cases, regional data are only available at the NUTS 1 level. In that case, NUTS 2 can not be identified. For the sake of completeness, we refer to those NUTS 1 level data wherever no data at the required NUTS 2 level are available. Ireland and Luxembourg are NUTS 2 regions themselves, so their national data suffice. NUTS information for other EU countries may vary. A special remark has to be made for Denmark. Comparably to Ireland and Luxembourg, for Denmark too, the NUTS 2 level coincides with the country as a whole. As mentioned before, however, for Denmark an "implicit" NUTS 2 classification exists, made up of three aggregates of NUTS 3 regions. For that reason for Denmark we refer to the NUTS 3 level.

In section 5.1 we will assess the availability of data from Eurostat while in section 5.2 alternative sources are given and evaluated. Country-specific information on data sources is given in annex A1.

5.1 Evaluation of the Eurostat database on regional stocks and flows

In the Eurostat databases New Cronos, data on regional stocks of foreign population are categorized in the database MIGRAT. In principle, data are available from 1985 onwards. Regional migration flows (immgration and emigration) are subsumed in the database REGIO and are in principle available from 1990 onwards. In general both stock and flow data are implemented in New Cronos until 1994/1995. By now

additional data have been collected, but have not yet been implemented in New Cronos. In order to carry out the analyses described in the previous chapters of this report, for a number of countries Eurostat provided some of these additional data too. In the current evaluation we took into account both the New Cronos data as well as the additional data not yet officially implemented in New Cronos. Although probably data for intermediate years will have been collected as well, this information was not available to us and therefore could not be considered.

Stocks

This section looks at the sources, quantity and quality of the Eurostat database on *foreign* stocks covering the years 1985 to 1998. Unless stated otherwise, all stocks data relate to the 1st January of each year.

In general there are three main sources to obtain information on migration: censuses, migration (or population) registers and surveys. Censuses attempt to record the whole population, normally at ten year intervals. In a census, everyone resident in a country on a particular point in time is counted and asked to reply to several questions. Information may be obtained for example on a persons country of birth, ethnic origin, or usual place of residence one year ago. Migration registers, on the other hand, provides information on the migration events themselves. The Netherlands and Sweden, for instance have systems of continuous registration in which all changes of permanent residence are registered (Hinde, 1998). Residence permits or permits to stay may also be used to define immigration flows. Register data are administrative data often carried out at a municipal level and therefore tend to have a higher coverage of the total population than census data. A disadvantage of register data is that it may be inconsistent or out of date, for instance as emigrants do not de-register on leaving or when there is a time-lag in processing. Census data on the other hand, often miss large numbers of foreign population or fail to identify specific migration flows whenever relevant questions to identify those flows were not be asked (Salt *et al*, 1994). In addition to census or register data, surveys may provide information of interest too. In surveys a sample of people is interviewed. In general questions may be asked comparable to those asked in censuses, but often surveys may be more detailed. Examples of surveys used to obtain information on international migration are the Labour Force Survey, which is common to a number of countries, and the International Passenger Survey conducted in the United Kingdom to cover the principal air and sea routes between the UK and overseas (excluding Ireland).

Table 5.1 shows for each EU-country the source (register, census, permit, or survey) and scale of the data and the years in the period 1985-1998 for which data are accessible through Eurostat. Also a broad indication is given of the breakdown by citizenship. This citizenship breakdown is discussed in more detail in annex A2.

It can be seen from Table 5.1 that there are data for 14 out of the 15 EU countries at some NUTS level, with only Germany and the United Kingdom not at the desired level of NUTS 2. For Belgium no regional data on foreign stocks are available (although national data (NUTS 0) are). From the summary of the citizenship breakdown for each country, as presented in annex A2, it can be concluded that in the Eurostat database on foreign stocks Denmark, Spain and Sweden have the most detailed data.

Table 5.1: Regional stock data on foreigners from Eurostat

Country	Data type	Years available	Spatial scale	Remarks
Austria	Census/register	1997	NUTS 3	TFP
Belgium				
Denmark	Register	1985-89, 91-95, 98	NUTS 3	CTZ (ctz)
Finland	Register	1993-95	NUTS 3	CTZ
France	Census	1990	NUTS 2	ctz
Germany	Registers	1991-93, 95	NUTS 1	CTZ (ctz)
Greece	Permits	1997	NUTS 2	CTZ
Ireland	Survey	1985-94, 96-98	NUTS 2 (3)	ctz
Italy	Permits/Register	1991-94	NUTS 2	CTZ
Luxembourg	Register	1987-92, 94	NUTS 2	TFP
Netherlands	Register	1985-95, 98	NUTS 3 (2)	CTZ (ctz)
Portugal	Permits	1997	NUTS 2	CTZ
Spain	Permits/Census	1987-95, 98	NUTS 3	CTZ
Sweden	Register	1985-87, 89-94	NUTS 3	CTZ
UK	Survey	1987-89, 91, 92, 94	NUTS 1	ctz

Notes:
TFP = total foreign population
CTZ = detailed breakdown by citizenship
ctz = limited breakdown by citizenship
CTZ (ctz) = for most years detailed breakdown by citizenship available; for some years limited breakdown by citizenship available
NUTS 2 (3) = for most years data available at the NUTS 2 level; for some years at the NUTS 3 level

Immigration and emigration

Although the Eurostat database provides data on regional immigration and emigration by sex and age, it only relates to total flows as there is no indication of citizenship (nationals and non-nationals are not differentiated). Nevertheless, it is still useful in identifying regional trends. In *Table 5.2*, the Eurostat data on regional immigration have been summarised. It can be seen that, with the exception of France, for all countries data at the NUTS 2 level are available for at least one year. Although in general no indication of citizenship is given, in Greece and Portugal immigration moves are only counted for non-nationals and therefore in the Eurostat database migration flows for those two countries refer to the foreign population only. Moreover, as the NUTS 2 level for Ireland and Luxembourg coincides with the country as a whole, for those two countries immigration by citizenship *is* available (comparable with immigration by citizenship at the national level for the other EU-countries). In France, information on immigration is collected from permits to stay. This information, however, is not available in the Eurostat database.

Table 5.2: Total regional immigration data from Eurostat

Country	Data type	Years available	Spatial scale
Austria	Register	96-97	NUTS 2
Belgium	Register	1995-96	NUTS 2
Denmark	Register/Permits	1990-97	NUTS 3
Finland	Register	1990-97	NUTS 2
France			
Germany	Register	1991-94	NUTS 2
Greece[1]	Register	1990-95, 97	NUTS 2
Ireland	Survey	1991-93, 96	NUTS 2
Italy	Register/Permits	1990-96	NUTS 2
Luxembourg	Register	1985-96	NUTS 2
Netherlands	Register	1990-97	NUTS 2
Portugal[1]	Census/Permits	1992-97	NUTS 2
Spain	Register/Census	1990-93, 96	NUTS 2
Sweden	Register	1985-97	NUTS 2
UK	Survey	1996	NUTS 2

[1] foreign population only

Regional emigration data are represented in *Table 5.3*. Overall, data on emigration flows are more or less comparable to data on immigration flows. Contrary to immigration, France does not collect data on emigration flows. For Greece too, no emigration data were available. Although for Portugal a number of emigration data were available, due to inconsistencies between data implemented and not yet implemented in New Cronos, those data were not included in the table. Emigration of Spain refers only to nationals. Similar to immigration, for Luxembourg emigration flows by citizenship are available; for Ireland, however, this is not the case.

Conclusion

It can be concluded that by now Eurostat has collected quite a number of regional NUTS 2 level data on international migration. For most countries, at least some regional data are available for stocks of foreign population as well as for immigration and emigration flows. On the other hand, the Eurostat data on regional stocks and flows are incomplete in terms of spatial and temporal coverage and data sources differ across countries. For Germany and the United Kingdom only stock data at the NUTS 1 level are available and for none of the countries data are implemented in New Cronos for the entire period of 1985-1998. This latter may (partly) be due to a delay between data collection and implementation. Differences in data availability between countries makes cross-national comparisons difficult, particularly as the data sources and collection methods vary so much.

Table 5.3: Total regional emigration data from Eurostat

Country	Data type	Years available	Spatial scale
Austria	Register	96-97	NUTS 2
Belgium	Register	1995	NUTS 2
Denmark	Register	1990-97	NUTS 3
Finland	Register	1990-97	NUTS 2
France[1]			
Germany	Register	1991-94	NUTS 2
Greece			
Ireland	Survey	1987-93, 95	NUTS 2
Italy	Register	1990-96	NUTS 2
Luxembourg	Register	1995-96	NUTS 2
Netherlands	Register	1990-97	NUTS 2
Portugal[2]			
Spain[3]	Register	1994-97	NUTS 2
Sweden	Register	1985-97	NUTS 2
UK	Survey	1996	NUTS 2

1 France does not collect emigration flow data

2 Portuguese emigration data in and not yet in New Cronos do not correspond and there are a number of problems. Therefore, the Portuguese data are left out of this table.

3 Spanish emigration data refer to nationals only.

An important drawback of the regional data on international migration flows available in the Eurostat database, is that those data are not classified by citizenship. As shown in the previous chapters, information on citizenship, or more general ethnic origin, is highly important for the purpose of linking regional stock and flow data. Therefore, for the current report, the database on foreign stocks is the most useful one as it indicates foreign citizenship and it covers for most countries quite a number of years.

5.2 Feasible routes to fill gaps in the database

This section looks at the availability of regional data that could be used to supplement the Eurostat databases. We explored the possibilities to add 1) the same information as mentioned in tables 5.1-5.3 for missing years; 2) more detailed information concerning the breakdown by age, sex and region; and 3) (detailed) information concerning *foreign* flows (as defined by foreign citizenship). Given that information on citizenship is essential to properly study the relationship between stocks and flows, citizenship was taken as first criteria. Where information relating to foreigners is only available at the NUTS 1 level, this has been referred to in place of a more detailed regional breakdown which does not differentiate citizenship.

Where possible, data at the NUTS 2 level have been identified, together with any other information on age, sex or citizenship using *Europe's International Migrants* (Salt *et al.*, 1994) as the starting point. That information was correct at the time of press and although the situation remains largely unchanged, it has been updated where

possible using information from the National Statistical Offices (NSO). Sending consistent questionnaires to all NSO's, however, to investigate what data are available and accessible, was beyond the scope of this study. Therefore, we relied on information more readily available, for instance documentary sources. In addition, we have approached individually those NSOs from which we did not have the information required (by telephone, fax and/or e-mail). We received positive responses from some NSOs, partial ones from others and no responses from the remainder. Where no information from NSO's was available, we tried to fill in the remaining gaps using data from the Migration Research Unit, the Internet, and SOPEMI[2] reports. We also contacted individuals such as the OECD's SOPEMI Correspondents who may have been able to answer our questions. Again there was a mixed response. As a consequence of this approach, the information used to update the tables differs across countries. Therefore, the final tables presented in this section and in the annexes show data which are *at least* available. Although we aimed at giving an overview of the most comprehensive collection of data available, for some countries a more complete data collection may exist.

Stocks

Table 5.4 shows how the Eurostat database could be updated with other sources relating to foreigners only. Additional data were found for all countries with the exception of Denmark and France. For Denmark, however, we received confirmation of the National Statistical Office on data availability at the national level by age, sex and citizenship. Given that the Eurostat database contains NUTS 3 data by detailed citizenship and that stock data for Denmark are based on register information, we assume that NUTS 3 data by citizenship are available for the entire period. Stock data for France, on the other hand, is only available for census years and therefore no additional data exist for the period 1985-1998 (the previous census was held in 1982 and the latest in 1999). Although for Italy data are available for the entire period, one cannot compare figures before and after the 'clean-up'of 1989 when total numbers registered fell by 30 per cent. As in Luxembourg stocks by citizenship come from the register and the census and statistics are published by the State Statistical Office (STATEC, see annex A1), we presume that for Luxembourg data will be available through the NSO (although we did not receive confirmation). Annex A3 shows all data available, combining Eurostat and other sources. In this annex almost no information on sex and age is included. Although we asked for information on citizenship, age and sex in our correspondence with the NSOs and other contacts, in some cases, we were told certain variables were not available while in other cases the information was not provided by the respondent. The information that *is* in annex A4 therefore, represents what we know is definitely there. Nevertheless, we assume that for most countries in principle data on age and sex will be available.

[2] Where it has not been possible to obtain information on availability of data for certain years from an NSO, we have referred to the national correspondent's unpublished annual report to the OECD's Continuous Reporting System on International Migration (SOPEMI) for that country. In many cases, national SOPEMI correspondents have access to data not readily available to other individuals. However, such data could be obtained from the relevant authority by Eurostat.

Table 5.4: Additional regional stock data on foreign population

Country	Data source	Years available	Spatial scale	Citizenship
Austria	NSO	All missing years	NUTS 2	Ctz
Belgium	NSO	All missing years	NUTS 2	TFP
Denmark				
Finland	NSO	All missing years	NUTS 3	Ctz
France				
Germany	SOPEMI	1985-90, 94, 97-98	NUTS 1	TFP (ctz)
	NSO	1996	NUTS 1	Ctz
Greece	SOPEMI	1996, 98	NUTS 2	TFP
Ireland	SOPEMI	1995	NUTS 2	Ctz
Italy	NSO	All missing years	NUTS 2	CTZ
Luxembourg	NSO	All missing years	NUTS 2	CTZ
Netherlands	NSO	1988-98	NUTS 3	CTZ
Portugal	SOPEMI	1990	NUTS 2	TFP
	NSO	1998	NUTS 2	TFP
Spain	NSO	All missing years	NUTS 2	CTZ
Sweden	NSO	All missing years	NUTS 3	CTZ
UK	NSO	All missing years	NUTS 1	TFP

Notes:
TFP = total foreign population
TFP (ctz) = for most years total foreign population available; for some years limited breakdown by citizenship available
CTZ = detailed breakdown by citizenship
ctz = limited breakdown by citizenship

Immigration and emigration

Table 5.5 shows how the Eurostat database could be updated with extra data for 12 of the 15 EU countries. For Denmark, France and Greece no additional information was available. Like for stock data, however, for Denmark we assume that detailed information at the NUTS 3 level is available for the entire period. For almost all countries, at least some information on citizenship is available. Annex A4 shows the collection of data available, combining the Eurostat database and additional sources.

The availability of additional emigration data is shown in *Table 5.6*. Annex A5 shows the collection of data available, combining Eurostat and other sources. It can be seen that generally fewer emigration data are available than immigration data, particularly in southern European countries. In the case of Greece, Portugal and Spain emigration flows relate only to nationals. As citizenship was taken as first criteria, no additional data for those countries are included in the table. As mentioned before, in France no statistics are collected on emigration flows. For Denmark again, we assume that detailed information at the NUTS 3 level is available for the entire period. A final remark has to be made concerning emigration flows. Emigration data that *do* exist are often less reliable than immigration data as there is little incentive for foreigners to inform authorities of their departure.

Table 5.5: Additional regional immigration data

Country	Data source	Years available	Spatial scale	Citizenship
Austria	NSO	1996-98	NUTS 2	TFP
Belgium	SOPEMI	1985-88	NUTS 1	TFP
	NSO	1989-98	NUTS 2	CTZ
Denmark				
Finland	NSO	All years	NUTS 2	TFP
France				
Germany	NSO	All years	NUTS 1	CTZ
Greece				
Ireland	SOPEMI	1987-90	NUTS 2	TP
	NSO	1994 onwards	NUTS 2	ctz
Italy	NSO	All years	NUTS 2	TP
Luxembourg	NSO	All years	NUTS 2	CTZ
Netherlands	NSO	All years	NUTS 2	CTZ
Portugal	NSO (LFS)	1985-89	NUTS 2	TP
	NSO (Permits)	1998	NUTS 2	TFP
Spain	NSO	All years	NUTS 2	ctz
Sweden	NSO	All years	NUTS 2	CTZ
UK	NSO	All years	NUTS 1	TFP

Table 5.6: Additional regional emigration data

Country	Data source	Years available	Spatial scale	Citizenship
Austria	NSO	1996-98	NUTS 2	TFP
Belgium	NSO	1989-98	NUTS 2	CTZ
Denmark				
Finland	NSO	All years	NUTS 2	TFP
France				
Germany	NSO	All years	NUTS 1	CTZ
Greece				
Ireland	SOPEMI	1987-97	NUTS 2	TP
	NSO	1994 onwards	NUTS 2	TP
Italy	NSO	All years	NUTS 2	TP
Luxembourg	NSO	All years	NUTS 2	CTZ
Netherlands	NSO	All years	NUTS 2	CTZ
Portugal				
Spain				
Sweden	NSO	All years	NUTS 2	TP
UK	NSO	All years	NUTS 1	TFP

Notes:
TFP = total foreign population
TP = total population (nationals and foreigners)
CTZ = detailed breakdown by citizenship
ctz = limited breakdown by citizenship

Summary and conclusion

Using Eurostat data and additional sources we have tried to identify the most relevant information available for the purpose of linking stocks and flows of international migration. Much of the information needed, however, can only be obtained through a full-scale survey of the NSOs. Such a survey was never envisaged as part of the study and would be costly in time and resources particularly for the responding institutions. In our view it would be possible to obtain further information but the timetable would, of necessity, be that of individual respondents. Given these restraints, a description of data *at least* available was composed in annexes A3, A4 and A5. From this review, it can be concluded that the countries with the most comprehensive data are Denmark, Finland, Ireland, Italy, Luxembourg, the Netherlands, Spain and Sweden. These eight countries have data covering at least ten continuous years. Belgium, Germany and the UK have much better data at the NUTS 1 level, whilst Austria, France, Greece and Portugal have incomplete data only.

Moreover, it can be assumed that in most of the EU countries, there is opportunity for improvement of the Eurostat databases on regional stocks and flows of international migration using data collected by the NSOs, or their equivalent. Although there would be differences in concepts, data collection methods, spatial disaggregation and time periods, additional sources could make the Eurostat databases more comprehensive. This in turn would allow more meaningful comparisons between countries and over time.

6. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Conclusions concerning theoretical and empirical issues

1. As a result of huge inflows of migrants in the past, today considerable groups of non-native population are settled in most countries of the European Union. As a consequence, the role of networks in international migration processes has become increasingly important.
2. Immigrants and migrant populations tend to be largely attracted to just a few urban regions. Therefore, the regional dimension in linking stocks and flows is highly significant.
3. In almost all countries and all types of regions (urban, border and other) considerable differences were found between the proportions of immigrants, stocks of foreign population and total numbers of inhabitants. Regions with a large population in general, receive a large number of immigrants, but in relative terms the share is smaller than proportional. Therefore, an allocation of immigrants proportional to the population is in general not correct.
4. For Germany and the Netherlands a clear relationship between regional stocks and flows of non-nationals appears to exist. Generally, immigration shares in non-urban regions were slightly higher than shares in stocks, while the opposite was found for urban areas.
5. As different migrant populations (or different networks) show different regional patterns, the main point of the network concept in modelling regional migration using stocks and flows is that the model should be applied to each group separately.
6. Regional immigration patterns may change over time. For the Netherlands, for instance, the pattern was very stable between 1988 and 1992, but changed thereafter. After 1992, the four large urban regions experienced a declining level of immigration while in the non-urban regions immigration has increased.
7. The concept of a migrant network implies that the network consists of members of the same group, with similar ethnicity, origin, language, culture etc.. Unfortunately, there is no agreement on how to define stocks of migrants. From a data availability perspective, current nationality of the person is the most realistic option for internationally comparable data.
8. The composition of the stock in migrant cohorts provides information on the migrant-attracting and retaining capabilities of the stock. The implication of this conclusion, however, cannot be followed up, since the collection of immigration cohort data is not feasible for most countries and at best only available upon special request in individual countries from the immigration register.
9. In general there is no simple linear relationship between the size of the stock and immigration. The duration of stay of the immigrant population, and the selective nature of return migration are important factors that change the direct impact of the size of the network on immigration.
10. In addition to the existence of networks of migrants, other determinants may have a significant impact on the attraction of immigrants at the regional level. Those determinants may be classified in five groups: economic factors, housing market variables, metropolitan character, geographical location of a region and regional amenities.

11. Return migration too, may vary strongly between various groups of migrants. In general, return migration propensities of migrants increase with the age of entry, and decrease with the number of years of residence.
12. Although asylum migration is highly regulated, the regional allocation of asylum migration may be partly determined by the number of foreigners residing in a region. Therefore, at least in some countries, an explicit link may exist between stocks and flows of migrants also in the case of asylum migrants.
13. As in recent history international migration was strongly determined by asylum migration, it can be expected that in the near future the number of family related migrants generated by these asylum migrants will increase.
14. Projecting regional emigration is usually done either by projecting national emigration totals, and distributing this total number over the regions of subpopulations (top down); or by using regional-specific emigration rates; these rates may be subject to scaling in order to guarantee consistency with the national level (bottom up or mixed).
15. There are basically three methods of calculating immigration shares. These may be characterized by the type of information they require: 1) historical shares: based on observed immigration flows over the regions in previous years; 2) regional stocks: based on the observed distribution of the (sub)population under study over the regions; 3) non-demographic variables: based on a regression-type equation that relates observed characteristics of the regions to observed regional immigration flows.
16. Model estimations of regional immigration patterns in the Netherlands at the NUTS 2 and the NUTS 3 level show that, in general NUTS 2 models perform slightly better than NUTS 3 models. However, the difference in the degrees of freedom has not been taken into account here.
17. On the basis of NUTS 2 model estimations for the Netherlands the inclusion of internal migration as a predictor of international migration seems to be justified; on the basis of NUTS 3 estimations, this is not the case.
18. The results of the test of using 1992 data to predict the 1995 spatial distribution of immigration, are generally better at the NUTS 2 level than at the NUTS 3 level. Moreover, the results for individual groups are better than for the aggregate of the groups. In general, the results of the models increase with the complexity of the models. The spatial distribution of migrants and migration by citizenship turned out to be a good predictor of the spatial distribution of immigration by origin. Net internal migration may be used as an additional predictor of immigration.

Conclusions concerning the Eurostat database and possibilities to fill gaps and collect new data

1. Data on foreign stocks are more comprehensive than data on foreign flows at the regional level. This is largely due to the fact that there is a Eurostat database on regional stocks by citizenship, but not on the flows of foreigners.
2. The Eurostat databases on total flows provide an indication of regional distribution, but cannot be taken to represent the flows of foreign citizens. Care must be taken to compare like for like and to create homogenous databases.
3. Information on foreign citizens is easier to compare over time than between countries. This is due to the different methods of data collection used and the varying levels of accuracy in each case.

4. In most of the EU countries there is opportunity for improvement of the Eurostat databases on regional stocks and flows of international migration using data collected by the National Statistical Offices, or their equivalent.

Recommendations

Recommendations concerning methodological issues

1. Assumptions on the spatial distribution of immigration of foreigners could be improved by using the spatial distribution of stocks of foreign population as predictor.
2. In view of the goal to improve the migration assumptions using stocks of migrant populations, the definition of the stock should ideally include at least two criteria: a link with the origin country (country of birth of the person) and a socio-cultural identification (ethnicity). Only with these criteria it is possible to define a network as meant in the theoretical model of network migration. From a data availability point of view, however, current citizenship is often the only option. Although citizenship seems to be an acceptable proxy, further studies on this topic are recommended.
3. As different types of migrants, for instance labour, family or asylum migrants, may show different regional migration patterns, it is important to distinguish those different types of migrants in the migration data. In most countries of the EU, migration statistics cannot directly make the distinction between those different groups. By linking stock and flow data at the micro level, however, attempts can be made to estimate the size of these groups (see De Beer *et al*, 1993 and Sprangers, 1994, 1996). By using this information at the regional level, more insight may be obtained in regional differences in chain migration.
4. Emigration rates, not numbers, should be used in projection models, both at the national and the regional level, since it establishes a direct link between the size and structure of the stock and the emigration flow.
5. Immigration should be modelled in a top down framework, with the total national number of immigrants distributed over the regions, using an allocation model.
6. A detailed breakdown of immigration and stocks according to origin and socio-cultural background is necessary in order to apply the linkages between stocks and flows in an optimal way.
7. Since in practice aggregations of groups are necessary, a study should be performed, in a limited number of countries with full information, as to the optimal level of aggregation of immigrants and stocks. The method applied in Van Imhoff *et al.* (1997) is perfectly suited to this question. The distinction between nationals and non-nationals is too crude.
8. A study should be performed to investigate the optimal way of using information about cohort data of immigrants in projecting migration. This study should use information about a limited number of countries where cohort information is available.
9. In situations where no regional stock information of immigrant populations is available, model (2) of chapter 4 should be used for allocating immigration totals to the regions, using regional shares based on the total stock (or related variable), and regional migrant group/age- and sex-specific immigration factors. If regional stocks of immigrant populations exist, model (3) of chapter 4 should be used, where the size of the regional stock is the predictor of regional shares using the

specified functional form, which may be group- as well as age- and sex-specific. If additional information on internal migration and/or external (non-demographic) variables is available, model (4) should be used.

10. Information on internal migration patterns may be used to improve international migration assumptions (the 'pull effect' of internal migration). The reverse relationship in which internal migration is predicted by regional immigration (the 'push effect' of international migration), was not taken into account in the current study. For a better understanding of the relationship between internal and international migration patterns, further research is needed on this issue (see Stillwell *et al.*, 1999).
11. External (non-demographic) information may be employed in regional migration scenarios. External information may be useful in projections where the external variables change in a predictable way.

Recommendations concerning the Eurostat database

1. Some gaps in the current database on stocks of foreign population can be filled in by using data collected by the NSOs, SOPEMI reports and other country-specific information.
2. Eurostat could create a database on regional international migration by citizenship, in order to complement the existing database on stocks. Where possible, this could include information on age, sex and citizenship.
3. To obtain additional information on regional data on stocks and flows of foreign population, a full-scale survey of the NSOs is recommended.
4. Ultimately, it is down to the member countries to provide relevant data. Therefore, the drive to create a comprehensive dataset on foreign stocks and flows at the regional level can only be implemented with their participation. A study should be performed to investigate the optimal way of providing the requisite information for each of the countries.
5. To improve the accessibility of the Eurostat data, it is recommended that the delay between data collection and implementation in the New Cronos databases will be reduced significantly.

REFERENCES

Blotevogel, H.H. and R. King (1996), European economic restructuring: demographic responses and feedbacks. *European Urban and Regional Studies,* 3 (2): 133-159.

Böcker, A. (1994), Chain migration over legally closed borders: settled immigrants as bridgeheads and gatekeepers. *Netherlands Journal of Social Sciences,* 30 (2): 87-106.

Böcker, A. and T. Havinga (1998), *Asylum migration to the European Union: patterns of origin and destination.* Luxembourg: Office for Official Publications of the European Communities.

Boyd, M. (1989), Family and Personal Networks in International Migration: Recent Developments and New Agendas. *International Migration Review*, 23 (3): 638-670.

Bretz, M. and H. Voit (1999), Links between Stocks and Flows of the Foreign Population in Germany. *Eurostat Working Paper*, 3/1999/E/no. 6.

Bucher, H. (1996), Migration and impact on internal distribution and redistribution of population. In: M. Frey and U. Mammey, *Impact of migration in the receiving countries, Germany.* Geneva: International Organization for Migration.

Bucher, H. (1999), Past and future trends of international migration patterns in Germany. *Joint ECE-Eurostat Work Session on Demographic Projections 1999*, Working Paper No. 38.

Bucher, H.J. and H.P. Gatzweiler (1992) Das neue regionale bevölkerungsprognose-modell der Bundesforschungsanstalt für Landeskunde und Raumordnung. In: *Informationen zur Raumentwicklung*, heft 11/12, pp. 809-826.

Buetow, S.A. (1994), International Migration: Some Consequences for Urban Areas in Australia and New Zealand. *International Migration*, 32 (2): 307-328.

Buisman, M. and P. Muus (1992), *International migration and the housing situation within the EC.* Amsterdam: Centrum Migratie Onderzoek, Vakgroep Sociale Geografie, Universiteit van Amsterdam.

Carrington, W.J., E. Detragiache and T. Vishwanath (1996), Migration with Endogenous Moving Costs. *The American Economic Review*, 86: 909-930.

Coleman, D. and J. Salt (1992), *The British Population; Patterns, Trends, and Processes.* Oxford: University Press.

Coleman, D. (1994), International migrants in Europe: Adjustment and integration processes and policies. In: M. Macura and D. Coleman (eds), *International Migration: regional processes and responses*, New York: United Nations.

Croes, M.M. (1995), Asielzoekers: het beleid en enkele demografishce aspecten. (Asylum seekers: policy and some demographic aspects.) *Maandstatistiek van de bevolking,* 95 (6): 6-16.

Croes, M.M. and L.T. van Huis (1997), Grootstedelijke migratie in historisch perspectief. (Big city migration in a historical perspective.) *Maandstatistiek van de bevolking,* 97 (1): 13-15.

Crommentuijn, L.E.M. (1997), *Regional household differentials; structures and processes.* Amsterdam: Thesis.

De Beer, J. and R. Tjemmes (1996), Prognose van remigratie; Forecast of remigration. *Maandstatistiek van de bevolking,* 96 (10): 6-9.

De Beer, J., H. Kuijper, R. Noordam and K. Prins (1993), The linking of immigrant flow and stock data in the Netherlands; present and future possibilities. *Statistical Journal of the United Nations ECE* 1993; 10: 321-334.

De Jong, A. and H. Visser (1997), International migration scenarios for the European Economic Area. *Eurostat Working Paper*, E4/1997-6.

Den Dulk, W. and H. Nicolaas (1998), Gezinshereniging and gezinsvorming onder asielmigranten. (Family reunification and family formation of asylum migrants.) *Maandstatistiek van de bevolking*, 98 (9): 8-16.

Dustmann, C. (1996), Return migration: the European experience. *Economic policy*, 22: 215-250.

Edmonston, B. and J.S. Passel (1992), Immigration and immigrant generations in population projections. *International Journal of Forecasting*, 8: 459-476.

Esveldt, I., I. Kulu-Glasgow, J. Schoorl and H. van Solinge (1995), *Migratiemotieven, migratienetwerken en partnerkeuze van Turken en Marokkanen in Nederland* (Migration motives, migration networks and partner choice of Turks and Moroccans in the Netherlands). NIDI report 43, Den Haag: NIDI.

Eurostat (1993), *Portrait of the regions – Volume 1, 3 and 4.* Luxembourg: Office for Official Publications of the European Communities.

Eurostat (1994), *Asylum seekers and refugees; a statistical report. Volume 1: EC Member States.* Luxembourg: Office for Official Publications of the European Communities.

Eurostat (1995a), *Acquisition of citizenship by naturalisation in the European Union – 1993.* Statistics in Focus, Population and Social Conditions, 1995 no.11.

Eurostat (1995b), *Regions – Nomenclature of territorial units for statistics – NUTS –* March 1995.

Eurostat (1999), *Demographic Statistics – Data 1960-99.* Luxembourg: Office for Official Publications of the European Communities.

Fassmann, H. and R. Münz (1992) Patterns and trends in international migration in Western Europe. *Population and Development Review*, 18 (3): 457-480.

Fassmann, H. (1994), International migration and regional distribution in Europe - Trends and Perspectives. *Joint ECE-Eurostat Work Session on Demographic Projections 1994.*

Fawcett, J.T. (1989), Networks, Linkages, and Migration Systems. *International Migration Review*, 23 (3): 671-680.

Fielding, A. (1993), Mass migration and economic restructuring. In: R. King (ed.) *Mass migration in Europe. The legacy and the future.* pp 7-18, London: Belhaven.

Gurak, D.T. and F. Caces (1992), Migration networks and the shaping of migration systems. In: M.M. Kritz, L.L. Lim and H. Zlotnik (eds), *International migration systems; a global approach.* Oxford: Clarendon Press.

Haug, W., Y. Courbage and P. Compton (1998), The demographic characteristics of national minorities in certain European states. *Council of Europe Population Studies No. 30*, Strasbourg: Council of Europe Press.

Haverkate R. and H. van Haselen (1992), *Demographic evolution in time in European Regions (Demeter 2015) Regional Development Studies, No. 01.* Luxembourg: Office for Official Publications of the European Communities.

Hinde, A. (1998), *Demographic Methods.* London: Arnold, a member of the Hodder Headline Group.

Hugo, G.J. (1981), Village-Community Ties, Village Norms, and Ethnic and Social Networks: a Review of Evidence from the Third World. In: G.F. de Jong and R.W. Gardner (eds.), *Migration Decision Making: Multidisciplinary Approaches to Microlevel Studies in Developed and Developing Countries.* New York: Pergamon Press.

Huisman, C. and L. van Wissen (1998), *Regionale Allochtonen prognose 1996-2016.* (Regional forecast of foreign population 1996-2016.) NIDI report no. 54; The Hague: NIDI.

King, R.L. (1993), European international migration 1945-1990: a statistical and geographical overview. In: R. L. King (ed.) *Mass Migration in Europe. The Legacy and the Future*. London: Belhaven.

Koser, K. (1997), Social Networks and the Asylum Cycle: The Case of Iranians in the Netherlands. *International Migration Review*, 31 (3): 591-611.

Kupiszewski, M. (1996), Extra-Union Migration: the East-West Perspective. In: P. Rees, J. Stillwell, A. Convey and M. Kupiszewski (eds.) *Population Migration in the European Union*. Chichester: John Wiley and Sons.

Leering, T.J. and H.J. Den Otter (1992), Buitenlandse migratie en regionale ontwikkelingen op COROP-niveau. INRO-TNO publication 92/NW/065; Delft: TNO.

Liebaut F. and J. Hughes (1997), *Legal and social conditions for asylum seekers and refugees in western European countries*. Internet publication: Danish Refugee Council.

Massey, D.S., J. Arango, G. Hugo, A. Kouaouci, A. Pellegrino and J.E. Taylor (1993), Theories of international migration: a review and appraisal. *Population and Development Review*, 19 (3): 431-466.

Mouqué, D. (ed.) (1999), *DGXVI Sixth Periodic Report on the Social and Economic Situation and Development of the Regions of the European Union.* Luxembourg: European Commission.

Münz, R. (1996), A continent of migration: European mass migration in the twentieth century. *New community,* 22 (2): 201-226.

NEI (1986), *Long-term regional demographic developments up to the beginning of the next century and regional policy*. Rotterdam: Commission of the European Communities and NEI.

NEI (1994), Regional population and labour force scenarios for the European Union. Part I: two long term population scenarios. Rotterdam: NEI; Erasmus University; NIDI.

Nelder, J.A. and R.W.M. Wedderburn (1972), Generalized Linear Models. *J.R. Statist. Soc., A*, 135: 370-384.

Nicolaas, H. (1999), Family-network migration after asylum migration in the Netherlands. *European Population Conference 1999.*

Papademetriou, D.G. (1994), International migration in North America: Issues, policies, implications. In: M. Macura and D. Coleman (eds), *International Migration: regional processes and responses*, New York: United Nations.

Poulain, M.(1993), Recent trends in stocks and flows of migrants in the member countries of the Council of Europe: a statistical approach. In: Political and demographic aspects of migration flows to Europe. *Council of Europe Population Studies No. 25*, Strasbourg: Council of Europe Press.

Poulain, M. and R. Gisser (1992), *Les méthodes de collecte des statistiques de migration internationale dans les pays de lÁELE et leur comparabilité avec celles des pays de la Communauté Européenne*, rapport rédigé à la requête des services statistiques de l'AELE, Luxembourg.

Rees, P. M. Kupiszewski, H. Eyre, T. Wilson and H. Durham (1999), *The evaluation of regional population projections for the European Union.* Report prepared for the European Commission, Directorate XVI and Eurostat, ERDF study No. 97/00/74/018.

Rogers, A. and J. Raymer (1998), The Spatial Focus of US Interstate Migration Flows. *International Journal of Population Geography*, 1998; 4: 63-80.

Salt, J. and A. Singleton (1995), *Analysis and Forecasting of International Migration by Major Groups.* Paper presented at the International Seminar 'New Long Term Population Scenarios for the European Economic Area'. Eurostat, Luxembourg, 8-10 November 1995.

Salt J., A. Singleton, and J. Hogarth (1994), *Europe's International Migrants, Data sources, patterns and trends.* London: HMSO

Sprangers, A.H. (1994), Gezinsherenigende en gezinsvormende migratie, 1987-1991. (Family reunification and family formation migration, 1987-1991.) *Maandstatistiek van de bevolking*, 94 (10): 11-18.

Sprangers, A.H. (1996), Estimating immigration flows by migration purpose. *Joint ECE/Eurostat Work Session on Migration Statistics 1996*, Working Paper No. 7.

Stillwell, J., H. Eyre and P. Rees (1999), *Regional International Migration and Interregional migration within the European Union: a Feasibility Study.* Study prepared for the Commission of the European Communities, DGXVI and Eurostat.

United Nations (1998a), *Recommendations on Statistics of International Migration – Revision 1.* New York: United Nations.

United Nations (1998b), *World Urbanization Prospects, The 1996 Revision.* New York: United Nations.

Van de Kaa, D.J. (1996), International mass migration: a threat to Europe's borders and stability. *De Economist,* 144 (2): 259-284.

Van der Gaag, N., E. van Imhoff and L. van Wissen (1997), Regional Population Projections in the Countries of the European Economic Area – Update of the 1992-Questionnaire. *NIDI Working Paper* no.: 97/1. Den Haag: NIDI.

Van der Gaag, N. and L. van Wissen (1999a), Analysis and Forecasting of International Migration by Major Groups (Part II). *Eurostat Working Paper* 3/1999/E/no. 9.

Van der Gaag, N. and L. van Wissen (1999b), *The subnational distribution of immigration and migrants within European countries, and the impact of the size of migration stocks upon immigration flows.* Paper presented at the European Population Conference 1999, The Hague, 30 August – 3 September 1999.

Van der Gaag, N., L. van Wissen, E. van Imhoff and C. Huisman (1999), National and Regional Population Trends in the European Union. *Eurostat Working Paper* 3/1999/E/no. 8.

Van Huis, L.T. and H. Nicolaas, (1999), Verhuizingen in de vier grote steden, 1997. (Big city migration, 1997.) *Maandstatistiek van de bevolking*, 1999; (99/5): 9-17.

Van Imhoff, E., L. van Wissen and K. Spiess (1994a), *Regional population projections in the countries of the European Economic Area.* NIDI CBGS publications no. 31; The Hague: Swets and Zeitlinger.

Van Imhoff, E., J. Schoorl, R. van der Erf and N. van der Gaag (1994b), Regionale prognose bevolking van Turkse, Marokkaanse, Surinaamse of Antilliaanse afkomst, 1992-2000. (Regional forecast of population of Turkish, Moroccan, Surinamese or Antillian origin, 1992-2000.) NIDI report no. 33; The Hague: NIDI.

Van Imhoff, E., N. van der Gaag, L. van Wissen and P. Rees (1997), The selection of internal migration models for European regions, *International Journal of Population Geography*, 3: 137-159.

Van Wissen, L. and H. Visser (1998), *An explanatory analysis of international migration flows within the European Economic Area.* In: C.Gorter, P. Nijkamp and J. Poot (eds.) Crossing Borders: Regional and Urban Perspectives on International Migration. Ashgate: Aldershot.

Waldorf, B. (1996), The internal dynamic of international migration systems. *Environment and Planning A*, 28: 631-650.

White, P. (1993), Immigrants and the social geography of European cities. In: R. King (ed), *Mass migration in Europe, the legacy and the future.* London: Belhaven Press.

Wilpert, C. (1992), The Use of Social Networks in Turkish Migration to Germany. In: M.M. Kritz, L.L. Lim and H. Zlotnik (eds), *International migration systems; a global aproach.* Oxford: Clarendon Press.

Wirtén, R. (1994), *The Key to Europe - a comparative analysis of entry and asylum policies in Western countries.* Stockholm: Swedish Ministery of Culture, Government Official Report, 1994/135.

Zagórski, K. (1990), Regional differences in immigration and economic structure in Australia. *International Migration*, 28 (3): 347-368.

ANNEXES

A1) Data collection methods and additional sources

In general migration data are obtained from one of the following three sources:

- Censuses attempt to record the whole population, normally at ten year intervals.
- Surveys record a sample of the population, for example Labour Force Surveys
- Population registers and the issue of residence permits are administrative data and often carried out at a municipal level.

AUSTRIA

- **Stocks**: data by nationality for the NUTS 2 Länder are collected and published by the Central Statistical Office (ÖSTAT) using the Population Census as a base. Additional information comes from the communal population register, aliens registers and permits to stay. The main sources of data are the *Statistisches Jahrbuch für die Republik Österreich*, *Bevolkerungsfortschreibung, Demographisches Jahrbuch* and the census results. The ÖSTAT website lists demographic Rapid Reports for each of the 9 Länder for the period 1961 to 1997.
- **Flows**: the flows of foreigners are mainly estimated from the Meldezettel, the declaration forms that make up the communal population register. These have been in force since April 1995; since 1996, ÖSTAT has published immigration and emigration data on foreigners at NUTS 2 in *Wanderungsstatistik*.

BELGIUM

- **Stocks**: data on the foreign population come from the Census and National Register, a copy of which is held by the Office of Foreigners. The National Statistical Institute (INS) compiles annual tables from the Census, with the last one in 1991. This provides information by commune (NUTS 5) and data on foreign stocks appear in *Statistiques Demographiques*. NUTS 2 data since 1985 can be obtained from the INS.
- **Flows**: these are calculated from registrations and de-registrations on the National Register; complete information on immigration and emigration by citizenship at NUTS 2 is available from 1989 onwards from the INS.

DENMARK

- **Stocks**: data come mainly from the computurised Central Population Register (CPR) as there is no census. It links together the local population registers which provide information on nationality, age and sex by municipality. National data, equivalent to a NUTS 2 region, are published by Danmarks Statistik.
- **Flows**: immigration is recorded in the registration office in the municipality in which residence is taken up. Tables available on request from Danmarks Statistik are by sex, age and nationality. The issue of residence permits is another source, published by the Ministry of Justice. Emigrants are recorded if they report an

external change of address to the last municipality of residence and this is aggregated into the CPR.

FINLAND

- **Stocks**: the stock of foreigners is calculated when they are entered on the population register, having been granted residence permits. Data also come from the Census and Register of Foreigners.
- **Flows**: regional flow data are provided by the Notification of Immigration Form and Notification of Emigration form. All data are collected and published by Statistics Finland (SF), with total flows for immigration and emigration available from 1985 onwards, by age and sex. Flows data on foreigners are available on request from SF.

FRANCE

- **Stocks**: the foreign population is recorded in the census; the results of the 1990 census were published by the National Institute of Statistics and Economic Studies (INSEE) in 1992 and include regional distribution. Stock data from residence permits are collected by the Ministry of the Interior but these are not available. Some statistics from residence permits are also produced by the Ministry of the Interior. *Recensement de la Population de 1990* (INSEE, 1991) has total foreign stocks at NUTS 2 from 1946 to 1990 (for census years), and stocks by sex and selected citizenships at NUTS 2 and 3 for 1990.
- **Flows**: immigration data from permits to stay are collected by the Ministry of the Interior but these are not available. Other flow data are collected from the records of OMI and OFPRA, based on permits to stay. France does not collect emigration data.

GERMANY[3]

- **Stocks**: the Census is the main source of data on the foreign population and provides information on citizenship, age and sex. The results are published in *Volkzählung* and a number of other publications. With the census as a base, the Federal Statistical Office (FSO) uses the Microcensus to extrapolate results by NUTS 1. 1996 data are published in *Migration und Integration in Zahlen* (Lederer, 1997).
- **Flows**: Population Registration Forms provide flow data, published in the *Statistical Yearbook* and *Migration Statistics*. The Central Register of Foreigners records arrivals and departures by sex, age and citizenship at NUTS 1; data are published by the FSO in '*Bevölkerung und Erwerbstätigkeit, Reihe 2 Ausländer*'. Data on total flows by NUTS 2 are available from the Statistik Regional website and the FSO. Pre-1991 data do not include the former GDR Länder.

[3] Although regional statistical offices are being set up by the new Federal States, most data relate to the old territories and are collected by the 16 Federal Länder. The Federal Statistical Office (FSO) then compiles and publishes national statistics.

GREECE

- **Stocks**: the 1991 Census provides data on foreigners according to residence. Data also come from Residence Permits and the Labour Force Survey, but neither are considered reliable. Data are published by the National Statistical Service of Greece (NSSG) in the *Annual Statistical Bulletin of Greece.* Until two years ago, about 80% of the estimated immigrants into Greece were non-documented, so there was no way of looking at regional distributions.
- **Flows**: no comprehensive migration data have been published since the frontier survey was abolished in 1977. Some citizenship data comes from the completion of Entry Cards, but not by region. Emigration data from the Passport control office relate to nationals who are permanently resident in Greece.

IRELAND

- **Stocks**: data come mainly from the Quarterly National Household Survey (QNHS - formerly the Labour Force Survey), which is used in conjunction with the Census and Residence Permits to provide information on nationality. Information is published by the Central Statistical Office (CSO), including *Population and Migration Estimates*.
- **Flows**: little information is collected on the flows of foreigners and existing data are unreliable. The main sources are the Census question on residence one year ago and unpublished data from the QNHS. Also, the Department of Justice produces a table from the Entry Cards of foreigners. The QNHS provides foreign emigration data.

ITALY

- **Stocks**: residence permits are the main source of yearly data on foreign stocks by region but it is not possible to compare data before and after the 'clean-up' of 1989 when total numbers registered fell by 30%. The census and municipal population registers also provide information. All data are published by ISTAT, including *La presenza straniera in Italia negli anni Novanta* and the *Statistical Yearbook.*
- **Flows**: it is hard to differentiate between stock and flow data from residence permits, and obtaining data on foreign immigration and emigration from population registers is impossible as there is no information on nationality. Total immigration and emigration data by sex and age from the population registers are available from 1969.

LUXEMBOURG

- **Stocks**: stocks by citizenship come from the Population Register and Census. Data on foreigners are also collected at a communal level (NUTS 5). Statistics from the population register and census are published by the State Statistical Office (STATEC).

- **Flows**: data come from the communal population registers and are published by STATEC. Information on immigration and emigration is by age, sex and nationality. Latest data are available on its website.

NETHERLANDS

- **Stocks**: data are collected and published by the Central Bureau of Statistics (CBS) from Population Registers, with information available on Statline CD-rom since 1988. Data are also published yearly in *Niet-Nederlanders in Nederland* (CBS) since 1991, with printed tables available from 1976. Applications for Residence Permits and Authorisation Visas provide another source, but the tables prepared by the Ministry of Justice are only available internally.
- **Flows**: data are recorded when people register and de-register on the local population register. The CBS publishes yearly immigration and emigration data on foreigners at NUTS 2 in *Maandstatistiek van de Bevolking*. Total immigration and emigration data are available from 1983 onwards.

PORTUGAL

- **Stocks**: Most data on foreigners are compiled from applications for Residence Permits and the Census, both of which provide regional distributions. The National Statistical Institute (INE) publishes statistics from the Census. Both the INE and the Ministry of the Interior publish data from the issue of residence permits; the annual INE publication *Relatório Estatístico Annual* has stocks by districts and nationality. However these districts do not correspond to the NUTS classification.
- **Flows**: Immigration data come from the issue of permits to stay, the Labour Force Survey (LFS) and the immigration record form. Emigration data come from emigration passports, but with a gap from 1989 to 1992 when they were discontinued. Total immigration from the (LFS) is available from 1984, whilst total emigration data appear in *Inquerito aos Movimentos Migratorios Saída* (INE) from 1993.

SPAIN

- **Stocks**: The main sources of data on the foreign population are the Pádron municipal population registers, census and the Residential Change Statistics (Estadistica de Variaciones, EVR), which all provide some level of regional distribution. Stocks by continent and main citizenships at NUTS 2 and 3 are published yearly in *Migraciones* by the Instituto Nacional de Estadistica (INE).
- **Flows**: Regional flow data are generated from the population register and EVR, with the results published yearly in *Migraciones*. This features the immigration of foreigners by EU/non-EU citizenship at NUTS 2. Emigration data, however, only relate to nationals.

SWEDEN

- The main source of stocks data is the Total Population Register (TPR), run at a national level by Statistics Sweden and based on regional information from the taxation authorities. Residence permits are another source of foreign stock data. Regional statistics are available on the Statistics Sweden website for payment and in *Befolkningsstatistik*, *Sweden in Figures* and the *Statistical Yearbook.*
- The immigration of foreigners is recorded in the civil registers system. Emigration of foreigners is recorded when the regional taxation authorities are informed. Total immigration and emigration by age and sex are available from the TPR since 1972.

UNITED KINGDOM

- Stock data come from the Labour Force Survey (LFS): published data from the Office of National Statistics (ONS) include information on nationality and region of destination. However, problems arise as one sample interviewee represents around 360 people in the final dataset, rendering figures under 10,000 too unreliable to be used. The census has no question on nationality, so is of no use concerning foreigners.
- Flow data by citizenship and region of destination/departure come from the International Passenger Survey (IPS): the data are published yearly by the ONS in *International Migration*. The data are again of limited use due to the standard errors.

A2) Summary of the Eurostat database on regional foreign stocks

COUNTRY	YEAR	NUTS	CITIZENSHIP DETAILS
Austria	1997	3	Total only
Belgium	N/A		
Denmark	1985-89	3	EU/EFTA, continents/regions and main citizenships
	1991	3	Most EU countries and continents
	1992	3	EU (total only) and continents
	1993-94	3	EU/EFTA, continents/regions and main citizenships
	1995	3	EU/EFTA, continents/regions and all citizenships
	1998	3	EU/EFTA, continents/regions and main citizenships
Finland	1993-95	3	EU/EFTA, continents/regions and all citizenships
France	1990	2	EU/EFTA (no total), continents/regions and main citizenships
Germany	1991-92	1	EU/total EFTA, continents/regions and main citizenships including CH
	1993, 95	1	6 countries only (GR, IT, TR, YU, BA, and HR) + SI in 1995
Greece	1997	2	All citizenships
Ireland	1985-92	2	EU total, Europe total and main citizenships (mostly EU)
	1993-94	2	EU total, but figures for UK and US only
	1996-98	3	EU total, but figures for UK and US only
Italy	1991-94	2	EU/EFTA, continents/regions and all citizenships
Luxembourg	1987	2	5 countries only (BE, DE, FR, IT, PT)
	1988-90	2	Totals only
	1991-92	2	5 countries only (BE, DE, FR, IT, PT)
	1994	2	Total only
Netherlands	1985-89	3	EU/total EFTA, continents/some regions
	1990-94	2	Most EU/EFTA (no totals for either), continents and main citizenships
	1995	3	All citizenships
	1998	3	Continents and all citizenships
Portugal	1997	2	EU12, continents and main citizenships
Spain	1987-89	3	EU (no total), continents/regions, main european citizenships inc. NO + CH
	1990	3	EU, continents/regions, main european citizenships inc. NO + CH
	1991	3	EU/EFTA, continents/regions and main citizenships
	1992	3	EU (some)/EFTA, continents/regions and main citizenships
	1993	3	EU/EFTA, continents/regions and main citizenships
	1994-95	3	EU/EFTA, continents/regions and all citizenships
	1998	3	All citizenships
Sweden	1985-87	3	EU/EFTA, continents/regions and all citizenships
	1989-94	3	EU/EFTA, continents/regions and all citizenships
UK	1987-89	1	EU only
	1991	1	EU and continents/regions
	1992	1	No foreign totals. EU and main citizenships; some NUTS regions patchy
	1994	1	EU (no total) and main citizenships inc. NO + CH

Notes:

1. Unless stated, 'EU' and 'EFTA' refers to individual member countries *and* totals
2. The term 'regions' refers to sub-continental areas, for example Central America
3. The years not mentioned have no data

ANNEX A3: SUMMARY TABLE FOR THE STOCKS OF FOREIGN POPULATION BY REGION[1] (at 01-01)

	1985					1986					1987					1988					1989					1990					1991				
	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship
Austria	NSO	2			ctz	NSO	2			ctz	NSO	2			ctz	NSO	2			ctz	NSO	2			ctz	NSO	2			ctz	NSO	2			ctz
Belgium	NSO	2			TFP	NSO	2			TFP	NSO	2			TFP	NSO	2			TFP	NSO	2			TFP	NSO	2			TFP	NSO	2			TFP
Denmark[2]	EU	3			CTZ	EU	3			CTZ	EU	3			CTZ	EU	3			CTZ	EU	3			CTZ	NSO	3			CTZ	EU	3			ctz
Finland	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ
France																										EU	2			CTZ					
Germany[3]	SOP85	1			ctz	SOP86	1			ctz	SOP87	1			ctz	SOP91	1			TFP	SOP91	1			TFP	SOP91	1			TFP	EU	1			CTZ
Greece																																			
Ireland	EU	2			ctz	EU	2			ctz	EU	2			ctz	EU	2			ctz	EU	2			ctz	EU	2			ctz	EU	2			ctz
Italy[4]	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	EU	2			CTZ
Luxembourg[5]	NSO	2			CTZ	NSO	2			CTZ	EU	2			ctz	EU	2			TFP	EU	2			TFP	EU	2			TFP	EU	2			ctz
Netherlands	EU	3			ctz	EU	3			ctz	EU	3			ctz	EU	3			ctz	EU	3			ctz	EU	2			CTZ	EU	2			CTZ
Portugal																										SOP90	2			TFP					
Spain	NSO	2			CTZ	NSO	2			CTZ	EU	3			CTZ	EU	3			CTZ	EU	3			CTZ	EU	3			CTZ	EU	3			CTZ
Sweden	EU	3			CTZ	EU	3			CTZ	EU	3			CTZ	NSO	3			CTZ	EU	3			CTZ	EU	3			CTZ	EU	3			CTZ
UK[6]	NSO	1			TFP	NSO	1			TFP	EU	1			ctz	EU	1			ctz	EU	1			ctz	NSO	1			TFP	EU	1			ctz

	1992					1993					1994					1995					1996					1997					1998				
	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship
Austria	NSO	2			ctz	NSO	2			ctz	NSO	2			ctz	NSO	2			ctz	NSO	2			ctz	NSO	2			ctz	NSO	2			ctz
Belgium	NSO	2			TFP	NSO	2			TFP	NSO	2			TFP	NSO	2			TFP	NSO	2			TFP	NSO	2			TFP	NSO	2			TFP
Denmark[2]	EU	3			ctz	EU	3			CTZ	EU	3			CTZ	EU	3			CTZ	NSO	3			CTZ	NSO	3			CTZ	EU	3			CTZ
Finland	NSO	2			CTZ	EU	3			CTZ	EU	3			CTZ	EU	3			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ
France																																			
Germany[3]	EU	1			CTZ	EU	1			ctz	SOP95	1			TFP	EU	1			ctz	NSO	1			ctz	SOP98	1			TFP	SOP98	1			TFP
Greece																					SOP97	2		*	TFP	EU	2			CTZ	SOP98	2			TFP
Ireland	EU	2			ctz	EU	2			ctz	EU	2			ctz	SOP96	2			ctz	EU	3			ctz	EU	3			ctz	EU	3			ctz
Italy[4]	EU	2			CTZ	EU	2			CTZ	EU	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ
Luxembourg[5]	EU	2			ctz	NSO	2			CTZ	EU	2			TFP	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ
Netherlands	EU	2			CTZ	EU	2			CTZ	EU	2			CTZ	NSO	3			CTZ	NSO	3			CTZ	NSO	3			CTZ	EU	3			CTZ
Portugal																										EU	2	*	*	CTZ	NSO	2	*		TFP
Spain	EU	3			CTZ	EU	3			CTZ	EU	3			CTZ	EU	3			CTZ	NSO	2			CTZ	NSO	2			CTZ	EU	3			CTZ
Sweden	EU	3			CTZ	EU	3			CTZ	EU	3			CTZ	NSO	3			CTZ	NSO	3			CTZ	NSO	3			CTZ	NSO	3			CTZ
UK[6]	NSO	1			TFP	NSO	1			TFP	EU	1			ctz	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP

KEY

Source: EU = Eurostat
NSO = National Statistical Office
SO = Data from the national correspondent's unpublished annual report to the OECD's Continuous Reporting System on International Migration (SOPEMI). Number indicates year of report.

Citizenship: TFP = Total foreign population only
ctz = limited breakdown by citizenship
CTZ = detailed breakdown by citizenship

Note

1. This table represents data *at least* available. This does not reflect the entirety of data held by Eurostat, as in some cases additional, or more detailed data were collected but were not (yet) implemented in the Eurostat databases. The same applies to data available at the NSO's. As a full-scale survey was beyond the scope of this project, it would be possible to obtain further information. The information in this Annex however, represents what we know is definitely there. The blank cells are gaps in the data and/or in our knowledge. We only refer to Eurostat data, if the data held by Eurostat are the most detailed data available; if more detailed data are available at other sources (ctz or CTZ is preferred over TFP; no preference is given to ctz or CTZ), we refer to the most detailed sources.
2. For Denmark we did not receive confirmation of the NSO on data availability at the NUTS 3 level. Given the source of information (register) and the fact that Eurostat has collected data at NUTS 3 level, we assume that for Denmark NUTS 3 level data are available.
3. Pre-1991 data do not include the former GDR Länder.
4. It is not possible to compare data for Italy before and after the end of 1989: since this date, expired residence permits have not been included
5. For Luxembourg we did not receive confirmation of the NSO on data availability
6. Data from the UK Labour Force Survey are currently classified at the Government Office Region level which equates to NUTS Before winter 1995, data are classified by Standard Statistical Regions (SSR). This classification does not match NUTS 1 exactly.

CONTENT

ANNEX A4: SUMMARY TABLE FOR IMMIGRATION BY REGION[1]

	1985					1986					1987					1988					1989					1990					1991				
	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship
Austria[2]																																		
Belgium	SOP90	1			TFP	SOP90	1			TFP	SOP90	1			TFP	SOP90	1			TFP	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ
Denmark[3]	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ
Finland	NSO	2	*	*	TFP	NSO	2	*	*	TFP	NSO	2	*	*	TFP	NSO	2	*	*	TFP	NSO	2	*	*	TFP	NSO	2	*	*	TFP	NSO	2	*	*	TFP
France																																		
Germany[4]	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ
Greece																										EU	2	*	*	TFP	EU	2	*	*	TFP
Ireland											SOP98	2	*	*	TP	SOP98	2	*	*	TP	SOP98	2	*	*	TP	SOP98	2	*	*	TP	EU	2		*	ctz
Italy	NSO	2	*	*	TP	NSO	2	*	*	TP	NSO	2	*	*	TP	NSO	2	*	*	TP	NSO	2	*	*	TP	EU	2	*	*	TP	EU	2	*	*	TP
Luxembourg	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ
Netherlands	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ
Portugal	NSO	2	*	*	TP	NSO	2	*	*	TP	NSO	2	*	*	TP	NSO	2	*	*	TP	NSO	2	*	*	TP	NSO	2	*	*	TP	NSO	2	*	*	TP
Spain	NSO	2			ctz	NSO	2			ctz	NSO	2			ctz	NSO	2			ctz	NSO	2			ctz	NSO	2			ctz	NSO	2			ctz
Sweden	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ
UK[5]	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP

	1992					1993					1994					1995					1996					1997					1998				
	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship
Austria[2]																					NSO	2		*	TFP	NSO	2		*	TFP	NSO	2		*	TFP
Belgium	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ
Denmark[3]	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ
Finland	NSO	2	*	*	TFP	NSO	2	*	*	TFP	NSO	2	*	*	TFP	NSO	2	*	*	TFP	NSO	2	*	*	TFP	NSO	2	*	*	TFP	NSO	2	*	*	TFP
France																																		
Germany[4]	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ
Greece	EU	2	*	*	TFP	EU	2	*	*	TFP	EU	2	*	*	TFP	EU	2	*	*	TFP						EU	2	*	*	TFP					
Ireland	EU	2		*	ctz	EU	2		*	ctz	NSO	2		*	ctz	NSO	2		*	ctz	EU	2		*	ctz	NSO	2		*	ctz	NSO	2		*	ctz
Italy	EU	2	*	*	TP	EU	2	*	*	TP	EU	2	*	*	TP	EU	2	*	*	TP	EU	2	*	*	TP	NSO	2	*	*	TP	NSO	2	*	*	TP
Luxembourg	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ
Netherlands	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ
Portugal	EU	2	*	*	TFP	EU	2	*	*	TFP	EU	2	*	*	TFP	EU	2	*	*	TFP	EU	2	*	*	TFP	EU	2		*	TFP	NSO	2	*	*	TFP
Spain	NSO	2			ctz	NSO	2			ctz	NSO	2			ctz	NSO	2			ctz	NSO	2			ctz	NSO	2			ctz	NSO	2			ctz
Sweden	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ
UK[5]	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP

KEY

Source:
- EU = Eurostat
- NSO = National Statistical Office
- SO = Data from the national correspondent's unpublished annual report to the OECD's Continuous Reporting System on International Migration (SOPEMI). Number indicates year of report.

Citizenship:
- TP = Total population only
- TFP = Total foreign population only
- ctz = limited breakdown by citizenship
- CTZ = detailed breakdown by citizenship

Notes

1. This table represents data *at least* available. This does not reflect the entirety of data held by Eurostat, as in some cases additional, or more detailed data were collected but were not (yet) implemented in the Eurostat databases. The same applies to data available at the NSO's. As a full-scale survey was beyond the scope of this project, it would be possible to obtain further information. The information in this Annex however, represents what we know is definitely there. The blank cells are gaps in the data and/or in our knowledge. We only refer to Eurostat data, if the data held by Eurostat are the most detailed data available; if more detailed data are available at other sources, we refer to the most detailed sources.
2. For Austria Eurostat has some figures (not included in New Cronos) for 1992-1994 as well, referring to total regional immigration flows. As these data have been produced artificially , these figures are not included in this annex.
3. For Denmark we did not receive confirmation of the NSO on data availability at the NUTS 3 level. Given the source of information (register) and the fact that Eurostat has collected data at NUTS 3 level, we assume that for Denmark NUTS 3 level data are available.
4. Pre-1991 data do not include the former GDR Länder.
5. Data from the UK Labour Force Survey are currently classified at the Government Office Region level which equates to NUTS Before winter 1995, data are classified by Standard Statistical Regions (SSR). This classification does not match NUTS 1 exactly.

CONTENT

ANNEX A5: SUMMARY TABLE FOR EMIGRATION BY REGION[1]

	1985					1986					1987					1988					1989					1990					1991				
	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship
Austria[2]																																		
Belgium																					NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ
Denmark[3]	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ
Finland	NSO	2	*	*	TFP	NSO	2	*	*	TFP	NSO	2	*	*	TFP	NSO	2	*	*	TFP	NSO	2	*	*	TFP	NSO	2	*	*	TFP	NSO	2	*	*	TFP
France[4]																																		
Germany[5]	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ
Greece[6]																																		
Ireland											SOP98	2	*	*	TP	SOP98	2	*	*	TP	SOP98	2	*	*	TP	SOP98	2	*	*	TP	SOP98	2	*	*	TP
Italy	NSO	2	*	*	TP	NSO	2	*	*	TP	NSO	2	*	*	TP	NSO	2	*	*	TP	NSO	2	*	*	TP	EU	2	*	*	TP	EU	2	*	*	TP
Luxembourg	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ
Netherlands	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ
Portugal[6]																																		
Spain[6]																																		
Sweden	EU	2	*	*	TP	EU	2	*	*	TP	EU	2	*	*	TP	EU	2	*	*	TP	EU	2	*	*	TP	EU	2	*	*	TP	EU	2	*	*	TP
UK[7]	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP

	1992					1993					1994					1995					1996					1997					1998				
	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship	Source	NUTS	Age	Sex	C'ship
Austria[2]																					NSO	2		*	TFP	NSO	2		*	TFP	NSO	2		*	TFP
Belgium	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ	NSO	2			CTZ
Denmark[3]	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ	NSO	3	*	*	CTZ
Finland	NSO	2	*	*	TFP	NSO	2	*	*	TFP	NSO	2	*	*	TFP	NSO	2	*	*	TFP	NSO	2	*	*	TFP	NSO	2	*	*	TFP	NSO	2	*	*	TFP
France[4]																																		
Germany[5]	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ	NSO	1	*	*	CTZ
Greece[6]																																		
Ireland	SOP98	2	*	*	TP	SOP98	2	*	*	TP	NSO	2	*	*	TP	NSO	2	*	*	TP	NSO	2	*	*	TP	NSO	2	*	*	TP	NSO	2	*	*	TP
Italy	EU	2	*	*	TP	EU	2	*	*	TP	EU	2	*	*	TP	EU	2	*	*	TP	EU	2	*	*	TP	NSO	2	*	*	TP	NSO	2	*	*	TP
Luxembourg	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	EU	2		*	CTZ	EU	2		*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ
Netherlands	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ	NSO	2	*	*	CTZ
Portugal[6]																																		
Spain[6]																																		
Sweden	EU	2	*	*	TP	EU	2	*	*	TP	EU	2	*	*	TP	EU	2	*	*	TP	EU	2	*	*	TP	EU	2	*	*	TP	NSO	2	*	*	TP
UK[7]	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP	NSO	1			TFP

KEY

Source:
- EU = Eurostat
- NSO = National Statistical Office
- SO = Data from the national correspondent's unpublished annual report to the OECD's Continuous Reporting System on International Migration (SOPEMI). Number indicates year of report.

Citizenship:
- TP = Total population only
- TFP = Total foreign population only
- ctz = limited breakdown by citizenship
- CTZ = detailed breakdown by citizenship

Note

1. This table represents data *at least* available. This does not reflect the entirety of data held by Eurostat, as in some cases additional, or more detailed data were collected but were not (yet) implemented in the Eurostat databases. The same applies to data available at the NSO's. As a full-scale survey was beyond the scope of this project, it would be possible to obtain further information. The information in this Annex however, represents what we know is definitely there. The blank cells are gaps in the data and/or in our knowledge. We only refer to Eurostat data, if the data held by Eurostat are the most detailed data available; if more detailed data are available at other sources, we refer to the most detailed sources.
2. For Austria Eurostat has some figures (not included in New Cronos) for 1992-1994 as well, referring to total regional emigration flows. As these data have been produced artificially , these figures are not included in this annex.
3. For Denmark we did not receive confirmation of the NSO on data availability at the NUTS 3 level. Given the source of information (register) and the fact that Eurostat has collected data at NUTS 3 level, we assume that for Denmark NUTS 3 level data are available.
4. In France no statistics are collected on emigration flows.
5. Pre-1991 data do not include the former GDR Länder.
6. Emigration data for Greece, Portugal and Spain are only registered for nationals, therefore no data by citizenship are available.
7. Data from the UK Labour Force Survey are currently classified at the Government Office Region level which equates to NUTS Before winter 1995, data are classified by Standard Statistical Regions (SSR). This classification does not match NUTS 1 exactly.

CONTENT