List of figures

Figure 2.1 Scatter plot of origin-destination migration flows in EU-25 as reported by origin ($EM_{ij}$) and destination ($IM_{ij}$) country, 1999-2007, with line of equality; logarithmic scale ................................................................. 14

Figure 2.2 Scatter plot of origin-destination migration flows in EU-25 from Germany (DE), Poland (PL) and Sweden (SE) as reported by origin ($EM_{ij}$) and destination ($IM_{ij}$) country, 1999-2007; logarithmic scale ................................................................. 15

Figure 2.3 Measures of similarity between immigration and emigration matrix, 1998-2007 .............. 21

Figure 2.4 Histograms of relative absolute difference ($RAD_{ij}$) for the period 1998-2007 by migration volume: [0, 20), [20, 400), [400, 5000) and [5000, Inf). The cut points are derived from the 1st, 5th and 9th deciles of migration volume .............................................. 22

Figure 2.5 Empirical cumulative distribution functions of relative absolute difference ($RAD_{ij}$) between immigration and emigration figures; 1999, 2003 and 2007 ................................................................................ 23

Figure 2.6 Histogram of relative absolute difference ($RAD_{ij}$) between immigration and emigration figures; 1999, 2003 and 2007 ................................................................................ 23

Figure 2.7 Observed and estimated proportions of different categories of $RAD_{ij}$; 2007 .................... 24

Figure 2.8 One-year transitions of relative absolute difference ($RAD_{ij}$); 1998-2007. Grey dashed lines indicate six categories of $RAD_{ij}$ ............................................................................. 25

Figure 3.1 Ratio of conditional migration measures for various lengths of duration threshold to conditional measures for one year; left panel: conditional migrations, right panel: conditional migrants .............................................................................................................. 43

Figure 3.2 Conditional migrations per conditional migrant for the same duration $t_m = t_M$; annual data ........................................................................................................................................... 44

Figure 3.3 Ratio of conditional migrations to conditional migrants, for various durations up to one year and intensity $\lambda = 0.2$; solid line is a contour line of value one; dashed line is a line of equality of $t_m$ and $t_M$ ......................................................................................... 45

Figure 3.4 Expected number (per individual) of transitions over intervals of different lengths for selected intensities ........................................................................................................ 47

Figure 3.5 Ratio of transitions over an interval of different lengths to transitions over one year... 48

Figure 3.6 Expected number (per individual) of conditional migrations for one year and transitions over one year with and without restriction on minimum duration of residence ........................................................................................................ 49

Figure 4.1 Relocation path of individual $k$ between three countries (A, B and C) over five years ........................................................................................................................................ 58

Figure 4.2 Relocation path of individual $k$ between countries A, B and C over five years observed in different countries of reference indicated in brackets ........................................................................ 59
Figure 4.3 Contribution of individual’s relocations to various migration measures (Ia, Ib, IIa, IIb, II, IV) by country A, B and C; vertical lines with arrows indicate relocations that are counted as migrations by respective countries of reference............................. 60

Figure 4.4 Proportion of total relocations in the system that satisfy a particular duration criterion applied in measure (III); exponential and Weibull duration model; two sets of origin-destination relocation intensities: $\lambda_{ij}$ and 0.1$\lambda_{ij}$....................................... 66

Figure 4.5 Shares of relocations that fulfil duration criteria of different lengths for measure (III); exponential and Weibull duration model; two sets of origin-destination relocation intensities: $\lambda_{ij}$ and 0.1$\lambda_{ij}$ ............................................................................... 66

Figure 4.6 Ratio of different migration measures, (Ia, Ib, IIb), to measure (III) for two sets of origin-destination relocation intensities: $\lambda_{ij}$ and 0.1$\lambda_{ij}$; left panel: exponential duration model, right panel: Weibull duration model................................................... 67

Figure 4.7 Migrations from countries A and C to country B according to measures IIa, IIb and III with different lengths of duration criterion, as observed by origin and destination countries; expressed as a proportion of the number of respective relocations; (a) exponential duration model, (b) Weibull duration model.................... 68

Figure 4.8 Ratio of immigration to emigration number according to measures IIb and III for origin-destination specific flows; left panel: exponential duration model, right panel: Weibull duration model ..................................................................................... 69

Figure 4.9 Emigration rates estimated from simulated relocations counted as migrations according to measure (III); left panel: exponential duration model, right panel: Weibull duration model, estimation under the assumption of constant hazard rates.... 70

Figure 6.1 Number of origin-destination specific migrations (solid line) and transitions (dashed line) for various durations up to one year........................................................................ 93

Figure 6.2 Person-years of residence (black bars) and person-years of actual stay in country of residence (grey bars) for various duration criteria in migration definition; country = 2, year = 10........................................................................................................... 94
Preface

This is a book about international migration data, and according to most definitions I became an international migrant on the way to the final sentence. I do not know if the road I chose was the best one to take. I do know, however, that thanks to fate or pure chance I had the privilege of staying in places where both well-established and promising future demographers were ready to share their knowledge and experience. Let me retrace my steps back to the first demographer I met.

In 2006, somewhat to my surprise, I was granted the opportunity of becoming a PhD candidate at the Population Research Centre (PRC) at the University of Groningen, the Netherlands. I would not have missed this opportunity for the world. I spent my three-year research period at the Netherlands Interdisciplinary Demographic Institute (NIDI) in the Hague. It was a very pleasant working environment with friendly colleagues who were ready to offer help of any kind. Thank you all. First and foremost, however, I would particularly like to thank Frans Willekens for his guidance, for many inspiring discussions, for support and encouragement, and for every single challenge he set me. This was an invaluable experience.

Frans had already become my mentor in September 2005. I came to the Max Planck Institute for Demographic Research in Rostock, Germany as a NIDI fellow to attend the European Doctoral School of Demography (EDSD). Here, in a stimulating international environment surrounded by dedicated and enthusiastic demographers I acquired not only demographic knowledge but also a group of friends. It is difficult to put into words exactly how much I enjoyed the camaraderie of the first EDSD cohort. I was also lucky enough to have the very understanding company of Ania.

Prior to this, I gained experience in Poland at the Central European Forum for Migration and Population Research (CEFMR) in Warsaw, where I got into demographic research and where I first encountered the field of harmonizing statistics on international migration. The idea for my PhD research originated here as well. I am greatly indebted to Dorota Kupiszewska and Marek Kupiszewski for their guidance and for providing a friendly and supportive atmosphere. My gratitude also goes to Michel Poulain together with all the other European partners from the THESIM project in which I took part.

The Warsaw School of Economics is where I heard the first story about demographics. An exceptional man of deep humanity told it: Jerzy Zdzisław Holzer. His great voice still echoes, guiding one in the right direction, even though he has passed on.

That is how my story unfolded. However, some other places are of special significance to me and they have not yet been marked on my map. They include Southampton and Leeds, where I attended migration workshops and summer school respectively. I am
particularly grateful to Phil Rees for sharing his insights and expertise. My next destination is St Andrews where I will again spend a period of time, taking with me good memories of the people I have met on my way. Some have been a considerable influence on me as a researcher and as a person. Some just smiled at me. Thank you to all of you. Many deserve special thanks and I hope they know who they are. Extra special thanks go to all my family and friends, wherever they are. They are always very close even if geography separates us.