Migration and Health – Empirical Analyses based on the German Socio-Economic Panel Study (SOEP)

INAUGURAL-DISSERTATION
zur Erlangung des akademischen Grades eines doctor rerum politicarum (Dr. rer. pol.)
an der Fakultät
Sozial- und Wirtschaftswissenschaften
der
Otto-Friedrich-Universität Bamberg

vorgelegt von

Diplom-Volkswirtin Monika Sander

Erstgutachter: Prof. Dr. Johannes Schwarze

Zweitgutachterin: Prof. Dr. Henriette Engelhardt-Wölfler

Tag der mündlichen Prüfung: 10.06.2009

Acknowledgement

The realisation of this dissertation would not have been possible without the kind support of a number of people to whom I would like to express my gratitude. First of all, I am deeply grateful to my supervisor Johannes Schwarze for his continuous support during the last couple of years. He steadily encouraged my work with lots of ideas and criticism. I would also like to thank Henriette Engelhardt-Wölfler for her advice and complementary guidance. Furthermore, I am highly indebted to Christoph Wunder for comments on earlier drafts as well as for helping me to take many hurdles, especially in the early stage of the project. This thesis has also benefited from many comments and suggestions by Ivonne Honekamp, Irena Kogan, and many participants at various conferences and workshops. In addition, I gratefully acknowledge financial support from the German Research Foundation.

My sincere thanks goes to my colleagues at the Graduate School "Markets and Social Systems in Europa", University of Bamberg. Especially, I would like to thank Anna Fräßdorf, Ruth Kamm, Tadeusz Kantor, Tomas Marttila, Eva Ruffing, Henrik Schillinger, and Christian Schmidt-Wellenburg for nice lunchs and evenings, table tennis matches, as well as their constant moral support. Furthermore, I thank my parents for their continuous support and encouragement. Finally, I am deeply thankful to Mathias. He was simply present when I needed it most.

Table of Content

List of Tables

List of Figures

List of Acronyms

AIC	Akaike's Information Criterion
AIDS	Acquired Immunodeficiency Syndrome
BAMF	Bundesamt für Migration und Flüchtlinge [Federal Office for Migration and Refugees]
BBR	Bundesamt für Bauwesen und Raumordnung [Federal Office for Building and Regional Planning]
BMI	Body Mass Index
CCHS	Canadian Community Health Survey
DIW	Deutsches Institut für Wirtschaftsforschung [German Institute for Economic Research]
EHA	Event-History Analysis
EU	European Union
FE	Fixed Effects
GDP	Gross Domestic Product
GDR	German Democratic Republic
GSS	General Social Survey
HIE	Healthy Immigrant Effect
HIV	Human Immunodeficiency Virus
i.i.d.	Independent, identically distributed
IV	Instrumental Variable
KiGGS	Kinder- und Jugendgesundheitssurvey [German Health Interview and Examination Survey for Children and Adolescents]
LC	Latent Class
LSIA	Longitudinal Survey of Immigrants to Australia
MQL	Marginal Quasi-Likelihood
MxFLS	Mexican Family Life Survey
Negbin	Negative Binomial Model
NHIS	National Health Interview Survey
NIS	New Immigrant Survey
NIS-P	New Immigrant Pilot Survey
NLMS	National Longitudinal Mortality Study

NPHS	National Population Health Survey
PQL	Predictive Quasi-Likelihood
PRM	Poisson Regression Model
RE	Random Effects
RKI	Robert Koch-Institut
SOEP	German Socio-Economic Panel Study
SHARE	Survey on Health, Ageing and Retirement in Europe
SRH	Self-rated Health
VPC	Variance Partition Coefficient
WHO	World Health Organisation
YSM	Years Since Migration
ZINB	Zero-Inflated Negative Binomial
ZIP	Zero-Inflated Poisson

Executive Summary

The so-called “healthy immigrant effect” (HIE) is one of the most striking findings concerning immigrants and their health status. It is usually said to consist of two parts: According to the first part, immigrants upon arrival are on average healthier than their native peers. This finding is mostly explained by self-selection among their origin population. The idea is that healthier individuals are more likely to migrate as they are more able to reap the reward of the ‘investment migration’ than less healthy individuals. However, according to the second part, this health gap between immigrants and natives closes after a relatively short period of time, and the health of immigrants is converging to that of the natives or is getting even worse. This gradient of immigrants’ health has been found in many countries (e. g., Australia, Canada, and United States) and for many different measures of health (e. g., self-rated health, chronic diseases). The causes for this decline in immigrants’ health are subject to ongoing research, but the underlying trajectories are not yet fully understood. In literature, there are several different explanations discussed: The adoption of destination-country habits and lifestyles, the structural and material relationship between a low socio-economic status and poor health, additional stress due to the migration process, persistent barriers to access to health care due to cultural or language factors, as well as a kind of “statistical artefact” explanation due to selection effects caused by return migration. As health is a rather complex concept one can assume that none of the proposed explanations can solely explain the decline in immigrants’ health, but rather that the health deterioration is a result of different interacting causes.

This thesis investigates three of the proposed possible explanations for a decline in immigrants’ health, namely return migration (chapter 3), the adoption of destination-country habits and lifestyles (chapter 4), and immigrants’ access to health care and utilisation of health care services (chapter 5). The results of these chapters are shortly summarised in the following.

The data are drawn from the German Socio-Economic Panel Study (SOEP), a longitudinal representative study of individuals and private households in Germany. Hence, throughout the study, panel data are used, which offer the possibility to take time-constant individual-specific heterogeneity into account. This allows, for instance, controlling for different behavioural attitudes, health beliefs, preferences, risk aversion, or genetic frailty.

In chapter 3 the role of health in return migration is investigated using thirteen waves (1993-2005) of the SOEP. The idea with regard to the HIE is that the decline in immigrants' health can additionally be caused by a kind of "statistical artefact" in the way that if healthier immigrants are more likely to remigrate, the average health of the remaining immigrants will decrease.
Overall, the results indicate that men in poorer health (measured through self-rated health, disability, and hospital visits) are significantly less likely to return home relative to healthier immigrants. For women, no clear results for the influence of health on return migration are found. Overall, at least for men, selection effects caused by return migration of healthier men might contribute to the deterioration of immigrants' health over time.

Chapter 4 analyses a possible contribution of a change in immigrants' health behaviour (especially, the Body Mass Index (BMI), alcohol consumption, and smoking) with duration of residence in Germany to the decline in immigrants' health. The idea behind is that immigrants' change there former healthy behaviour and adopt – in the course of acculturation – the life style of their host country, which is assumed to be more harmful to health.
With regard to the BMI – drawing on three waves (2002, 2004, and 2006) of the SOEP – it is found that the BMI increases with additional years in Germany for men and women. Thereby, the idea that changes in lifestyle and environment might lead to a weight gain can be supported. Regarding the potential influence of an increase in the BMI to the deterioration of immigrants' health with years since migration it can be concluded that a weight gain might indeed contribute to the decline in health.
For alcohol consumption only a cross-section analysis can be carried out as the question has only been included in one wave (2006) of the SOEP. It can be

shown that an additional year in Germany increases the probability of being abstinent. However, none of the estimated coefficients is significant.
For smoking, duration of residence is found to have a different influence on the smoking probability for men and women. For men, the coefficient of years since migration is negative, but not significant. Taking into account, that in many immigrant source countries, the smoking probability is higher than in Germany, this can be interpreted as support for the acculturation hypotheses. Thereby acculturation comes along with 'good' health behaviour, a possibility which has been rather neglected in the existing literature. Therefore, in future studies on health behaviour, more attention should be drawn on the possibility of a positive change in the health behaviour (at least for smoking). For women, it is found that the probability of smoking increases with additional years of residence in Germany. As the smoking prevalence for women is in most of the immigrant source countries smaller than for Germany, this finding can again be interpreted as support for the acculturation hypothesis.

In chapter 5 immigrants' access to health care and utilisation of health care services is analysed. Thereby, it is investigated if there is inequity in access to or in the utilisation of health care services due to a lack of language skills or due to a lack of information about the health care system (approximated by years since migration) among first- and second-generation immigrants in Germany. The data used are drawn from eleven waves of the SOEP (1995-2006).
With regard to the probability to contact a physician (as a proxy for access), German language skills are found to have no significant influence for all groups of immigrants. The hypothesis of inequity in access to health care due to access barriers caused by a lack of German language skills is therefore not supported by the data. However, mother tongue language skills seem to be important for the contact probability of the first- and second-generation: Having only good or poor mother tongue language skills reduces the probability of a doctor contact. The effect is found to be significant for first- and second-generation men. This might be explained by the fact that immigrants could go to doctors speaking their mother tongue, but having only poor language skills in the mother tongue hampers this possibility. For the

frequency of doctor visits (utilisation), poor German language skills are found to exert a significant influence – in contrast to the contact decision: Those reporting poor language skills have a lower expected number of doctor visits. The effect is found to be significant for first-generation men and for second-generation men and women. Hence, there seems to be inequity in health care utilisation due to lacking German language skills. With the exception of first-generation men – where it is found that poor mother tongue language skills reduce the expected number of doctor visits significantly, no significant effect is found for mother tongue language skills.

With regard to the duration of residence, the results indicate that years since migration have an impact on the contact decision of first-generation immigrant women, whereby a significant positive influence is found. Hence, missing knowledge about the health care system could create additional access barriers and yield inequity in access to health care in the group of first-generation women. The duration of residence seems to have no influence on the frequency decision.

1 Introduction

1.1 General motivation

In 2007, nearly every fifth individual in Germany had migration background and more than 7.2 million individuals without German nationality were residing in Germany, which accounts for about 8.9% of the total population (see Federal Office for Migration and Refugees (BAMF) 2007: 175; Federal Statistical Office 2007, and chapter 1.2.2 for a detailed overview). Hence, immigrants and their descendants play an important role in the determination of major economic, social, and health indicators in Germany (e. g., unemployment rates, educational attainment, gross domestic product (GDP), or life expectancy).

There is a huge literature on immigrants' economic performance. For example, there are many studies focusing on the labour market – labour force participation and earnings – (e. g., Borjas 1985, 1995; Chiswick 1978; Kogan 2004; Seifert 1995), on immigrants' savings and wealth (e. g., Cobb-Clark and Hildebrand 2006), or on immigrants' educational attainment (e. g., Haisken-DeNew et al. 1997; Kalter and Granato 2007; Kristen et al. 2008; Wagner et al. 1998). There is also literature related to immigrants' social and cultural integration into the host country's society (e. g., Dietz 2003; Fertig 2004; Palo et al. 2005).

However, another important aspect, namely the health of immigrants, has long been a rather neglected issue, which is only recently gaining more and more interest.[1] So far, rather little is known about the determinants of immigrants' health. This is rather surprising, because it is well known that immigrants suffer from a higher burden in various areas of life, which can cause serious health damages (e. g., Becher et al. 1997; Collatz 1989, 1994, 1998; Seifert 1995). Additionally, health can be regarded as one of the most important

[1] An interesting hint to that is, for example, the recent development of an online platform on immigrants' health, called 'MIGHEALTHNET'. This project develops wikis on migration and health for seventeen European countries "which will function as nodes for European and national networks for exchanging knowledge and expertise among stakeholders in the field" (www.mighealth.net). At the end of September 2008 the first national 'MIGHEALTHNET' meeting has taken place at the University of Bielefeld.

sources of human well-being. On the one hand, health has a direct effect on utility or happiness. On the other hand, health has an indirect effect on utility as it affects the productivity and therefore the capacity to generate income and wealth, and it affects the capacity to enjoy other sources of well-being. Therefore, understanding the determinants of immigrants' health is important for various reasons: First, it can help to promote the overall health and welfare of the immigrant population in Germany. Second, it might help to understand the association between exposure to the German social, cultural, and physical environment and health.

In literature, one of the most striking findings in the field of migration and health is the so-called "*healthy immigrant effect"* (HIE). This effect is usually said to consist of two parts: According to the first part, immigrants are upon arrival on average healthier than their native peers. This is mostly explained by self-selection among their origin population, in a way that healthier individuals are more likely to migrate. However, according to the second and especially interesting part, this health gap closes after a relatively short period of time, and thus the health of immigrants is converging to that of the natives or is getting even worse. The HIE has been studied extensively in Australia (e. g., Biddle et al. 2007; Kennedy and McDonald 2006), the United States (e. g., Antecol and Bedard 2006; Jasso et al. 2004), and Canada (e. g., Deri 2004; McDonald and Kennedy 2004; Newbold and Danforth 2003), while there is only little research on that topic in Germany (two notable exceptions are Lechner and Mielck 1998 as well as Ronellenfitsch and Razum 2004).

The underlying trajectories for the decline in immigrants' health are subject to an ongoing debate, but are not yet fully understood. There are several possible explanations discussed in literature: The adoption of destination-country habits and lifestyles, the structural and material relationship between a low socio-economic status and poor health, additional stress due to the migration process, persistent barriers to access to health care due to cultural or language factors, as well as a kind of "statistical artefact" explanation due to return migration. As "health" is a complex concept one can assume that none of the proposed

explanations can solely explain the decline in health, but rather that different causes interact together.
Nevertheless, a deeper understanding of the determinants of immigrants' health and the different factors, which might contribute to a decline in immigrants' health, can yield valuable lessons about how the health and well-being of immigrants could be improved.

Based on empirical analysis using data from the German Socio-Economic Panel Study (SOEP), this thesis investigates three of the potential explanations discussed for the decline in immigrants' health (namely return migration, adaptation of health behaviour as well as access to and utilisation of health care services).[2]

The outline of the thesis is as follows: After a detailed overview on the literature and the possible explanations regarding the HIE (chapter 2), return migration as a possible additional explanation for the decline in immigrants' health is discussed (chapter 3). Chapter 4 concentrates on the possible contribution of immigrants' health behaviour (especially Body Mass Index (BMI), smoking, and alcohol consumption) to the deterioration of immigrants' health, and chapter 5 analyses the access to and the utilisation of health care services of immigrants in Germany. Finally, chapter 6 provides with conclusions and a discussion of the results.

This thesis adds to the literature in several ways: First, the role of health in return migration is a rather under-researched topic, and – as far as I know – this analysis is the first empirical work, which analyses health explicitly as a determinant of return migration. Second, for Germany, the health behaviour of immigrants as well as immigrants' access to health care and utilisation of health care services are still a "blind spot", and this study contributes to the literature in exploiting the available information in the SOEP regarding these questions. Third, panel estimators are used throughout the study. This allows controlling for time-constant individual-specific heterogeneity like genetic disposition or the environmental impact in the country of origin.

[2] The first part of the HIE – immigrants' health advantage upon arrival – is not addressed in this study due to data limitations.

The outline of this introductory chapter is organised as follows: In section 1.2 an overview on the migration history in Germany is presented and the most important immigrant groups in Germany are introduced. Section 1.3 provides a short introduction into the field of migration and health. Finally, in section 1.4 different available data sets are presented, followed by a discussion why the SOEP has been chosen in this study as database for the empirical analysis.

1.2 Migration to Germany

1.2.1 Phases of immigration to Germany

The post-war immigration history in Germany is usually divided into several – quite distinct – phases. Those phases cannot always be sharply confined from each other.

The end of the Second World War and the post-war period was the beginning of the first immigration period, which lasted until 1954. During this phase, the Allied Occupation Zones had to accommodate about twelve million post-war refugees and expelled individuals (Bade and Oltmer 2004: 52ff.; Ulrich 1998: 18). Those individuals came mostly from former German territory, but nevertheless perceived as harassers from the resident population. This period is not outlined here, as those 'immigrants' will not play a role in the subsequent analyses. Further information about this phase can be found in Bade and Oltmer (2004).

The second – and probably the most influencing – immigration phase began in 1955 with the recruitment of the so-called "guest workers" (*Gastarbeiter*). The guest workers were actively hired by the German federal labour office to work in German factories and in the service sector to relieve the German economy from the labour shortage during the "economic miracle". Mostly single young men – or young married men without their families – came from Greece, Italy, Morocco, Portugal, Spain, Tunisia, Turkey, or former Yugoslavia according to bilateral agreements with the respective sending countries. Those treaties for recruitment were signed with Italy in 1955, Greece and Spain in 1960, Turkey

in 1961, Morocco in 1963, Portugal in 1964, Tunisia in 1965, and former Yugoslavia in 1968.[3] The building of the Berlin Wall in 1961 and the subsequent stop of "immigrants" from the German Democratic Republic (GDR) thereby resulted in a sharp increase in the recruitment of guest workers (see Ulrich 1998: 18). And hence, between 1955 and 1965 their number augmented from 80,000 to 1.2 million (see Treibel 1999). As the term guest workers demonstrates, their residence was intended to be limited, following a rotation principle, and the guest workers themselves were guided by the motive to return back after having saved "enough" money. In fact, estimates suggested that about two thirds of all guest workers returned back to their home country between 1961 and 1976 (see Böhning 1981: 37), whereby the return rates differed significantly by country of origin and the therewith connected possibility to move freely between the countries. According to Böhning (1981: 37) 9 of 10 Italians, 8 of 10 Spanish, 7 of 10 Greeks, 5 of 10 Yugoslavs, and 3 of 10 Turks returned home. Nevertheless, a considerable number of guest workers preferred to stay in Germany due to better working conditions (see Werner 2001). Triggered by the oil price shock and the subsequent increasing unemployment, the German government implemented a recruitment stop for foreign workers from non-EU member countries in 1973. This marked the end of the second phase of the German migration history.

After this 'ban of recruitment' (*Anwerbestopp*) family members of migrants already settled in Germany were further on allowed entering. Therefore, from 1973 on, immigration was characterised by family reunification. This can be described as the third immigration phase.

In 1983, the German government enacted a law to enhance return migration (*Gesetz zur Förderung der Rückkehr von Ausländern*). It included three instruments to boost return migration: Financial incentives (about 5,000 Euro per person plus a supplement for children), a reduction of return barriers, and the offering of advisory services for potential returners. The most important instrument was the financial incentive (see Hönekopp 1987). The official number of individuals who left Germany due to these instruments was about

[3] Former Yugoslavia includes Bosnia and Herzegovina, Croatia, Macedonia, Montenegro, Serbia, and Slovenia.

300,000 (see Heyden 1986). However, Hönekopp (1987) stated that most of the individuals would have returned anyway, and thus he estimated the additional effect of the law at only around 133,000 individuals. Hence, despite of the financial incentives offered by the German government, a large number of immigrants decided to stay and to take their families to Germany. Additionally, with the enlargement of the European Union in the 1980's and 1990's, guest workers from Italy, Spain, and Greece acquired residence rights, which further eased the stay of immigrants from those countries.

Since 1950, Germany experienced the immigration of more than 3.9 million ethnic German 'resettlers' (*Aussiedler*, since 1993 *Spätaussiedler*) from Eastern Europe (especially Poland and Romania) and the former Soviet Union (see Dietz 1999; Treibel 1999: 32ff.). The term ethnic Germans is used for Germans, who moved into the former Soviet Union or other Eastern European countries before the Second World War. After the Second World War many of these ethnic Germans and their offspring had to suffer from forced resettlement and ethnic discrimination, and hence they were allowed to "remigrate" to Germany and automatically received German nationality when entering the country (see Kurthen 1995: 921). Before 1989, the influx of ethnic Germans was rather low, but with the fall of the iron curtain, a huge immigration wave of ethnic Germans followed with almost 2.5 million immigrants from 1990 to 2007, whereby the peak of the immigration flow was in 1989 and 1990 (see BAMF 2007: 51ff.). This marked the fourth immigration phase, whereby the immigration profile has changed considerably in comparison to the guest workers' profile and to that of ethnic Germans before 1989. As Dietz (1999) noted, immigration was still motivated by ethnic considerations and family reunification, but the economic and social break-down of the countries of origin served to an increasing degree as a push factor.

To contain the large immigration wave of ethnic Germans, Germany adopted its policy regarding ethnic Germans and introduced several restrictions by a change of the law (see Zimmermann 1999). First, ethnic Germans had to apply for their immigration already in the country of origin, thus allowing Germany to regulate the number of immigrants. In 1993, the immigration of ethnic

Germans was furthermore regulated by a quota system, which restricted the inflow of ethnic Germans up to a number of 220,000 per year. Second, with the exception of individuals living in the former Soviet Union, ethnic Germans had to prove that they were suffering from discrimination due to their German origin. And finally, in 1996, a German language test was introduced, and ethnic Germans had to prove that they possess German language skills (see BAMF 2007: 46ff.). Therefore, since 1990, the number of ethnic Germans is steadily declining. In 2007, only 5,792 ethnic Germans moved to Germany (compared to 397,073 in 1990) (see BAMF 2007: 52).

Another large immigrant group since the 1990s are the politically persecuted and refugees of war, who have come to Germany as asylum seekers. Since 1953, about 3.2 million individuals have applied for asylum in Germany, thereof more than two million since 1990, with the highest number in 1992. Since then, the number is decreasing, because the entrance of asylum seekers was limited by a change of the asylum law. Asylum seekers come from diverse countries such as Afghanistan, Iran, Iraq, Lebanon, Serbia, Montenegro, Syria, or Turkey, and hence their composition is very heterogeneous (see BAMF 2007: 96ff.).

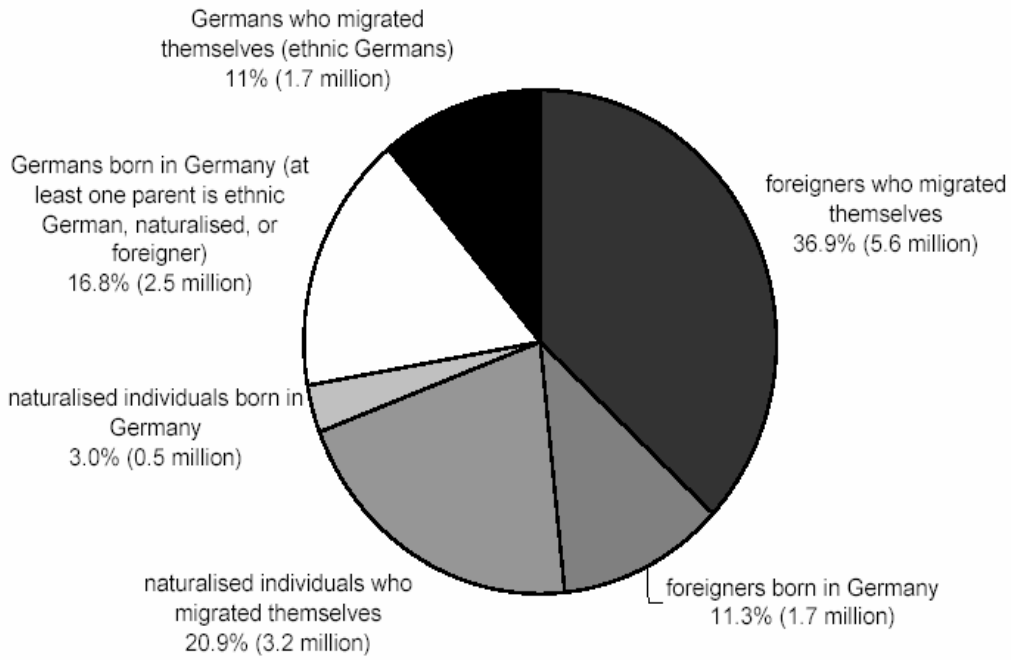
Since 2000, the German government tries to enhance high skilled immigration, for example through the "Green Card" initiative for IT-specialists (see, for example, BAMF 2007: 88ff.; Pethe 2006). Up to now, the immigrants that entered Germany due to such initiatives do not represent a considerable quantity.

1.2.2 Immigrants in Germany

First, it is important to clarify the definitions of the terms immigrants, foreigners, and individuals with migration background. In 2007, the number of individuals with migration background augments to about 15.1 million individuals, which accounts for about 20% of the total population (see BAMF 2007: 187ff.; figure 1.1). Among this group, about 7.6 million individuals have German nationality (i. e., naturalised individuals and ethnic Germans) and

about 7.3 million have foreign nationality. About two thirds of all individuals with migration background (about 10.4 million individuals) have immigrated themselves (first-generation immigrants) and about one third (about 4.6 million individuals) was born in Germany (second- or third-generation immigrants) (see BAMF 2007: 188ff.; figure 1.1).

Figure 1.1: Individuals with migration background in Germany in 2006



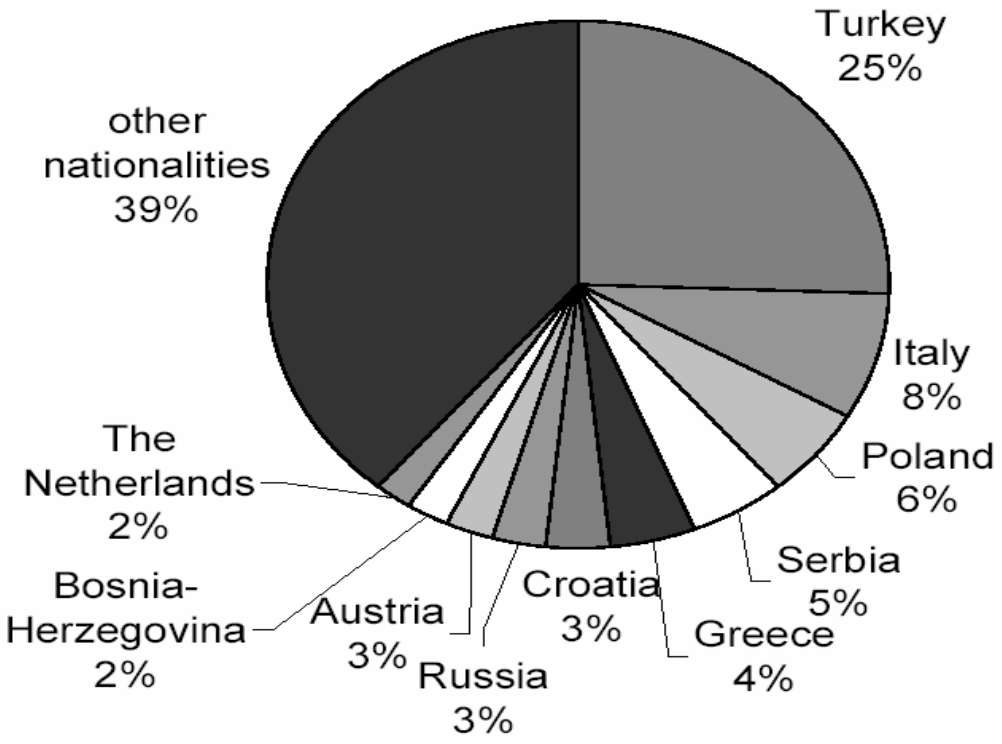
Source: According to BAMF 2007: 189

In the following, the terms immigrants and individuals with migration background are used synonymously, meaning all of the individuals specified in figure 1.1. The term ‘foreigners’ refers to individuals with foreign nationality, irrespective of the country of origin. The term ‘first-generation immigrants’ is used for individuals who migrated themselves and are thus born outside Germany, irrespective of their nationality (including therefore ethnic Germans, naturalised individuals, and foreigners). The term ‘second-generation immigrants’ is used for individuals born in Germany (thus including foreigners, naturalised individuals, and children of ethnic Germans).

The following gives a more detailed picture on the composition of the immigrant population in Germany.

In 2007, more than 7.2 million individuals without German nationality are living in Germany, which accounts for about 8.9% of the total population (see BAMF 2007: 175; Federal Statistical Office 2007). Figure 1.2 displays the foreign population in Germany according to nationality in 2007.

Figure 1.2: Foreign population in Germany according to nationality in 2007



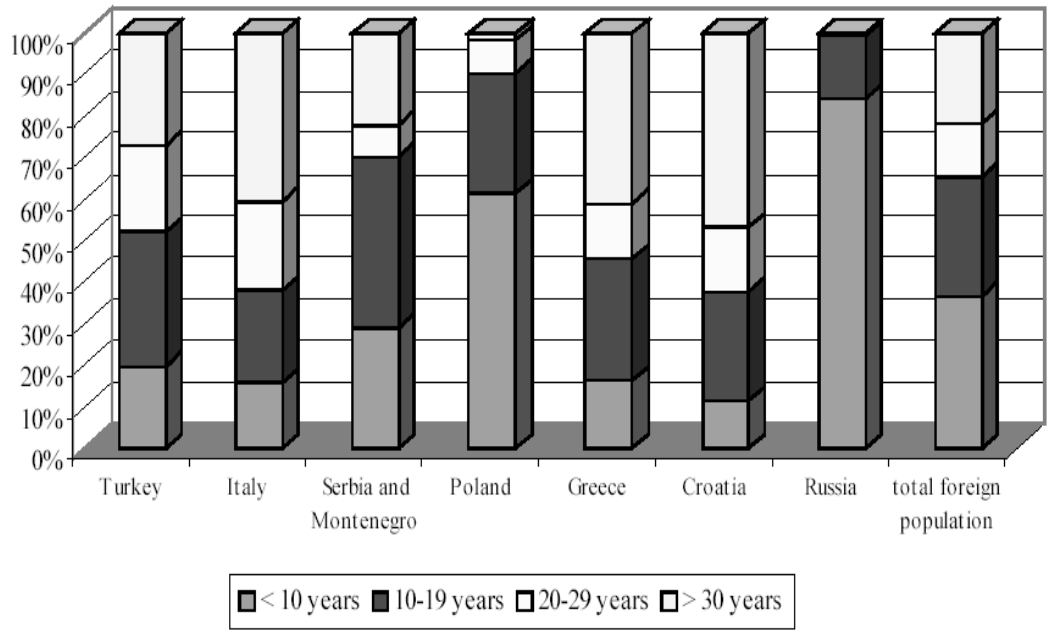
Note: values are rounded; Serbia excludes former Serbia and Montenegro
Source: BAMF 2007: 177

The Turkish population represents with 25.4% the largest group of foreign residents, followed by Italians with 7.8%, Polish with 5.7%, and Serbians with 4.9% (see figure 1.2). With regard to different regions of origin, overall, about a quarter of all foreigners living in Germany are EU-14 nationals[4], 13.6% come from former Yugoslavia (excluding Slovenia), about 10.3% come from the new European countries (EU-10),[5] and 6.9% come from the former Soviet Union (excluding the Baltic states) (see BAMF 2007: 177).

[4] The EU-14 encompasses Austria, Belgium, Denmark, Finland, France, Greece, Great Britain, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Sweden, and Spain.
[5] The EU-10 includes the following countries: Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovenia, and Slovakia.

Figure 1.3 shows the duration of residence according to different nationalities in 2007. At the end of 2007, more than 60% of the foreign population have lived in Germany for at least ten years, more than 35% for at least twenty years, and more than 20% for more than thirty years (see BAMF 2007: 182). Especially immigrants from the former guest worker countries have on average a rather long duration of residence in Germany: 82.5% of the Turks, 85.4% of the Greeks, 85.7% of the Italians, and 89.3% of the Croatians reside in Germany for at least ten years. In contrast, Russian and Polish immigrants have until now a rather short duration of residence, with 80.6% of the Russian and 62.7% of the Polish immigrants residing less than ten years in Germany (see figure 1.3).

Figure 1.3: Duration of residence according to nationality in 2007



Source: BAMF 2007: 182

In 2007, the average duration of residence for immigrants from all countries of origin augmented to 17.7 years. Above this average are Slovenians with a average duration of residence of 28.8 years, Spanish with 26.8 years, Austrians with 26.5 years, Croatians with 26.2 years, Italians with 25.8 years, Greeks with 25.0 years, Dutch with 23.9 years, and Turks with 21.5 years. The average duration of residence of the Turks has been decreased by the large number of Turkish immigrants who arrived in the last ten years. An average

duration of residence below the average can be found for the Polish with 9.1 years, the Romanians with 7.7 years, Bulgarians with 7.1 years, Ukrainians with 7.0 years, and Russian with 6.7 years (see BAMF 2007: 182).

Overall, in 2007, 11.3% of all foreign residents were born in Germany (43.4% of all Italians, 40.8% of all Turks, 38.4% of all Greeks, but only 15.2% of the Polish and 7.2% of the Russian) (see BAMF 2007: 190).

Despite these high numbers of foreigners born in Germany or residing already for many years in Germany, the German government was very hesitating with regard to naturalisations, considering Germany for a long time as a non-immigration country. Consequently, there is still a high share of non-naturalised foreigners, who have lived in Germany for more than 20 or 30 years.

Since the Citizenship Act (*Reichs- und Staatsangehörigkeitsgesetz*) of 1913 the German nationality law is based on the principle of "ius sanguinis", the right of blood. Hence, unlike in other countries, where the nationality law is based on the principle of "ius soli" (e. g., Australia or France), individuals born on German territory with foreign parents do not get German nationality, but the nationality of their parents.

In 1999, the nationality law was reformed, and from January 1st 2000, children who are born in Germany are granted German nationality if one parent is living in Germany for more than eight years and has permanent residence right (see BAMF 2006: 179). However, in cases where children are in possession of both nationalities (the German and the one of their parents), they have to choose one of them at the age of 18. If they want to keep their foreign nationality, they have to give up the German citizenship.

Finally, it should be taken in mind that – even if in the following it is often referred to 'the immigrants' – the group of individuals with migration background is not homogenous and not always easily to define. Immigrants differ in various aspects: First, they are from quite different countries of origin,

and have therefore diverse cultural backgrounds. Second, individuals migrate due to varying motives (e. g., economic reasons, family reunification, or refugees and asylum seekers). Third, immigrants differ according to their legal status, which also influences their representation in official statistics (see Robert Koch-Institut (RKI) 2008: 9ff.).

1.3 Migration and health

Questions about the comparability of natives and immigrants in terms of their health status, about the explanations for migration-related inequalities in health, and about the influence of the immigration experience on immigrants' health are gaining recently more and more interest in the public health and epidemiological literature. So far, none of these questions is sufficiently answered.

First, this section gives a short overview on the findings with regard to the health situation of immigrants (chapter 1.3.1), and afterwards, some recent approaches to structure the different influence factors on immigrants' health are introduced (chapter 1.3.2).

1.3.1 The health situation of immigrants

The aim of this section is to give a brief overview on the literature regarding the health status of immigrants. It should be taken in mind that the studies, which were analysed for this overview, used quite different data sources. Hence, the definition of the immigrant status might not be consistent among them.

In the international literature, it is often highlighted that immigrants suffer from certain additional health risks and that immigrant status is an important determinant of health inequalities (see Schenk 2007). For example, it has been shown that migrants have a higher prevalence of infectious diseases like tuberculosis, HIV/AIDS, or hepatitis (e. g.,Brodhun 2008; RKI 2008: 38ff.),

overweight and obese (e. g.,Erb and Winkler 2004; Frederiks et al. 2005; Kuepper-Nybelen et al. 2005; Lindstrom and Sundquist 2005; Oberwöhrmann and Bettge 2007; Will et al. 2005), or worse dental health (e. g., Kühnisch et al. 2003; Sundby and Petersen 2003; Taani 2002; Van Steenkiste 2003). Individuals, who 'migrated' due to prosecution or expulsion, suffer often from a post-traumatic stress disorder. For Germany, it has been estimated that, in 1999, 3,200 Bosnian refugees suffered from severe consequences of a traumatic experience, which amounts to a percentage of about 8% (see Jäger and Rezo without year: 39).

In contrast, it has also been shown that migrants suffer less from certain diseases like asthma, neurodermatitis, or hay fever (e. g., Grüber 2005; Rottem et al. 2005; Windorfer and Bruns-Philipps 2002). Additionally, the mortality rate from coronary heart disease has found to be lower for migrants than for natives (e. g., Razum and Twardella 2002; Razum and Zeeb 2000; Razum et al. 1998). For cancer, it has been shown that there are differences in the incidence and mortality between migrants and natives depending on the kind of cancer (e. g., Bhopal and Rankin 1996; Parkin et al. 2005; Zeeb et al. 2002).

As can be seen from this short overview, the picture on immigrants' health is so far rather fragmented, giving insights into the prevalence of specific diseases in the immigrant population or highlighting differences in morbidity patterns between immigrants and natives. However, the relationship between migration and health is complex and multifactorial, and so far, rather little is known about the underlying trajectories and the determinants of immigrants' health. The next chapter outlines recent approaches to develop a structural model on the determinants of immigrants' health.

1.3.2 Determinants of immigrants' health

So far, a comprehensive approach to model the relationship between migration and health is lacking (see Razum 2007; Schenk 2007; Spallek and Razum 2008: 271). However, there are several factors discussed in literature, which might influence immigrants' health (e. g., genetic disposition, environmental

exposure or risk factors in the country of origin, factors related to the migration process (e. g., additional stress, loss of social networks), barriers to access to health care, health care utilisation and health behaviour as well as the social position in the host country) (see also chapter 2 for a detailed discussion of these factors). Hence, both, factors related to the country of origin and factors related to the host country are influencing immigrants' health (see Schenk 2007).

In the following, two recent approaches are presented, which combine the different influence factors on immigrants' health in a structural model.

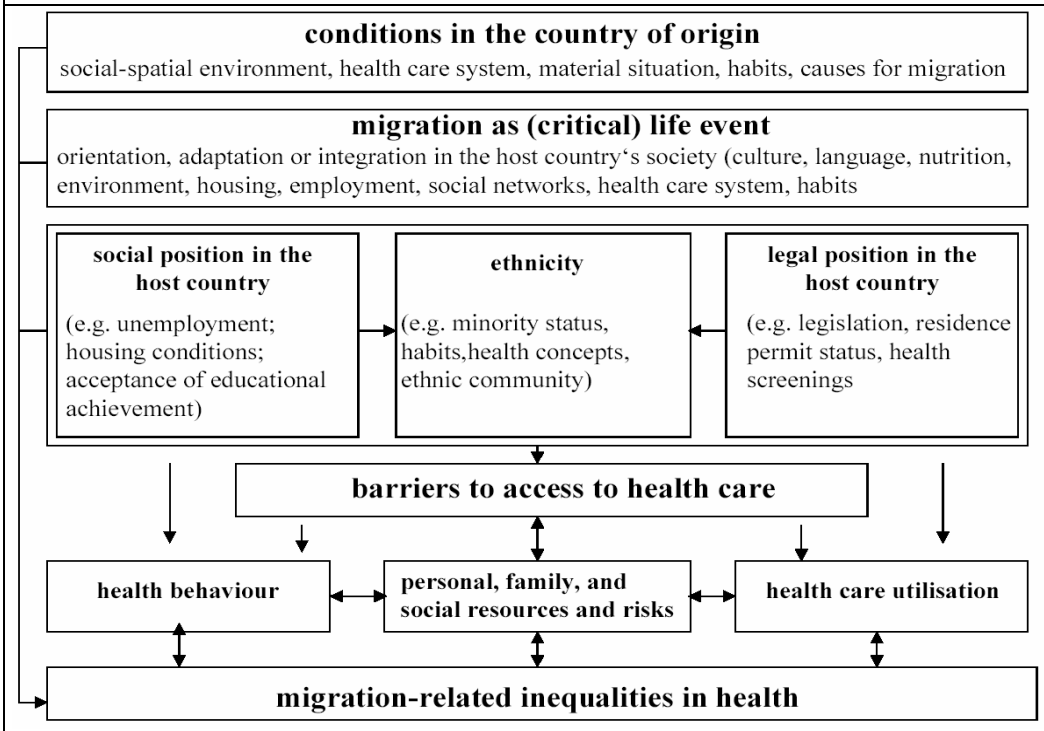
Schenk (2007) identified in her structural model six central dimensions, which distinguish an individual with and without migration background and which can thus yield to health differences between those groups (see figure 1.4).

1) differences between the country of origin and the host country with regard to health-influencing factors (e. g., environmental exposure, health care, life style, motives for migration),
2) the migration process itself (e. g., orientation and adaptation processes)
3) the social situation of immigrants in the host country (e. g., employment situation, education chances),
4) the legal situation of immigrants in the host country (e. g., residence permit status, health screening),
5) ethnicity-related factors (e. g., discrimination)
6) barriers to access to health care (caused by language or cultural factors),
7) health behaviour (e. g., nutrition, physical activity, alcohol consumption, or smoking) and utilisation behaviour, and
8) personal, family, and social resources (e. g., social networks, cognitive skills).

These dimensions are not independent from each other. For example, the legal position in the host country might create barriers to access to health care (for

example, if immigrants do not know about their rights to receive health care). This lack of knowledge can thus influence their utilisation behaviour.

Figure 1.4: Structural model of the relationship between migration and health



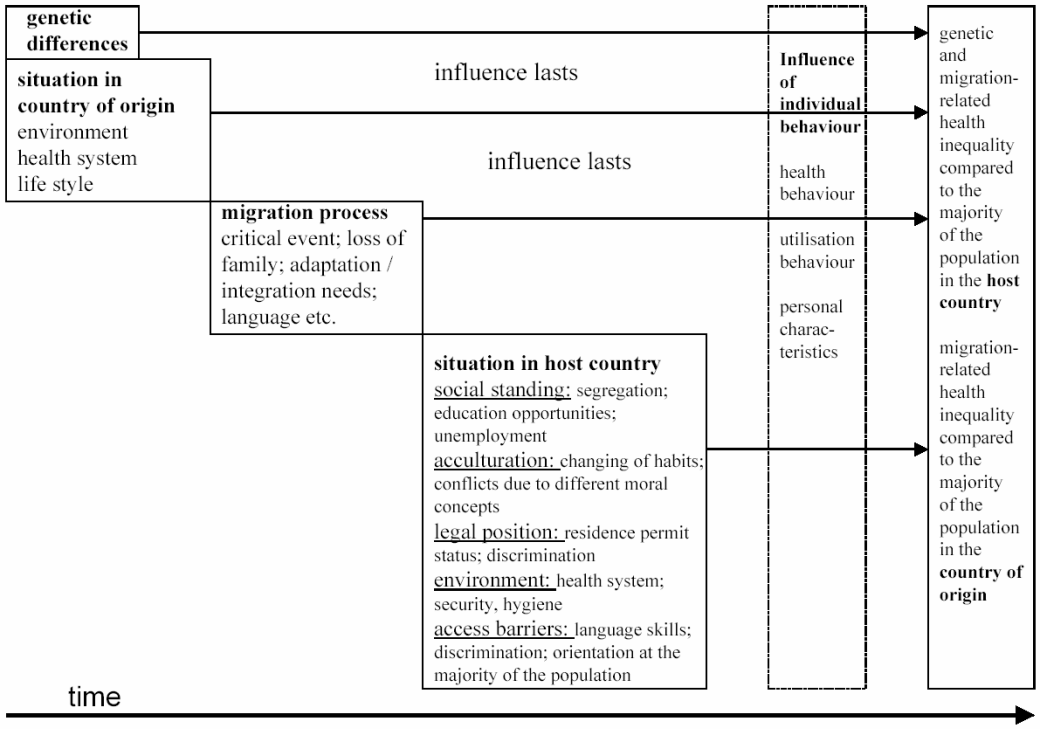
Source: According to Schenk 2007

In a more recent approach Spallek and Razum (2008) extended previous approaches by considering the life course of the immigrants (see figure 1.5). They distinguished between five different groups of influence factors on immigrants' health:

1) genetic differences,
2) situation in the country of origin (e. g., environmental exposure, sanitation, health care system, life style, nutrition),
3) factors related to the migration process (e. g., loss of social networks, language difficulties),
4) situation in the host country (such as unemployment, language and cultural barriers, or a different health care system),
5) individual behaviour (e. g., health behaviour or utilisation behaviour).

Thereby the influence of genetic disposition and the situation in the country of origin lasts and influences the health of immigrants in the host country.

Figure 1.5: Influence factors on migrants' health during the life course



Source: According to Spallek and Razum 2008: 283

Additionally, Spallek and Razum (2008: 283ff.) highlighted the importance of the choice of the reference group for immigrants' health. Until now, immigrants' health is mostly compared to the health of the population of the host country. But the authors noted, that it is also necessary to compare immigrants' health with the health of the population in the country of origin and with immigrants' health from the same country of origin who migrated to another host country (see Spallek and Razum 2008: 285). This has so far been rather neglected, particularly due to data limitations.

These structural models fit into the broader discussion of the HIE and the possible explanations for the decline in immigrants' health, where mostly all of the included influence factors in these models are discussed. A detailed discussion for the variables which are analysed in this study (access to health care as well as health care utilisation and health behaviour) is therefore provided in chapter 2 and the respective empirical chapters.

1.4 Selection of the database

The selection of the database is a key issue of any analysis. For the study at hand, the database should meet three particular demands: First, it is an essential condition that immigrants and individuals with a migration background can be identified. Hence, a database is needed, which provides information on the country of origin and nationality. Both information are relevant for the analysis to allow for the inclusion of all immigrants and their children (second-generation immigrants), irrespective of their nationality. Additionally, information about the duration of residence is necessary to analyse the evolution of immigrants' health over time. Second, the database has to include information on the health status, health behaviour, and health care utilisation. Third, a panel design is preferable, because it offers the possibility to control for time-constant unobserved individual-specific heterogeneity like genetic disposition or environmental impacts of the country of origin.

Overall, available data sources are still rather limited, and reliable population-based data are missing for the immigrant population (see Lampert et al. 2005: 127). For example, official statistics disclose normally only the individual's nationality, and hence, naturalised immigrants or ethnic Germans cannot be separately identified and enter the analyses as natives.

In general, several data sources for questions with regard to health are discussed: Data from health insurances or other social insurance agencies, the German microcensus, the Survey on Health, Ageing and Retirement in Europe (SHARE), the German Health Interview and Examination Survey for Children and Adolescents (KiGGS), the federal health survey of 1998 (*Bundes-Gesundheitssurvey* 1998) as well as the German Socio-Economic Panel Study (SOEP).[6] (. The subsequent paragraphs roughly discuss the advantages and disadvantages of the mentioned data sources and explain why the SOEP has been chosen for the analyses at hand.

[6] See RKI (2008: 26ff.) for a short overview on all available health databases in Germany and the respective migration-related information that they include.

Data from health insurances or other social insurances data have the advantage that they provide enough information to analyse infrequent events (death or rare illnesses). Additionally, these secondary data do not suffer from non-response bias, which is often assumed to be higher among individuals with migration background (see RKI 2008: 24). However, these data sources do usually not include information on the country of origin, duration of residence, or socio-economic status. This is a huge drawback for the analysis at hand as this information is essential with regard to the research questions. Besides, these data are – due to data protection rules – usually rather highly aggregated, for example, in terms of regions and nationality (see RKI 2008: 24). This makes it difficult to investigate, for example, regional differences in health inequalities or in the access to health care among different immigrant groups.

The **German microcensus** is a continuous random household sample survey, providing official representative statistics on the population in Germany.[7] It covers 1% of all households in Germany (about 390,000 households with 830,000 individuals) and is conducted on an annual basis (see Federal Statistical Office 2006). According to a partial rotation method, every household remains in the sample for four years. The questionnaire contains a basic choice of questions which are asked annually, and which respondents are legally obliged to answer (such as individual data (age, sex, nationality, etc.), data on family and household relationships, questions regarding main or secondary residence, information on employment or unemployment, educational and vocational attainment, data on the income situation as well as on obligatory pension or nursing care insurance). Additionally to this basic program, every four years supplementary questions are asked on a voluntary basis to topics such as housing situation, health insurance, or health status (see Federal Statistical Office 2006). The questions concerning health have been asked in 1995, 1999, and 2003. Since 2005, with the commencement of the "microcensus law 2003", it is now possible to identify individuals with migration background through additional questions (e. g., former nationality, nationality of the parents, or year of immigration) (see Federal Statistical Office 2006, 2008). Hence, in 2007, the supplementary questions on health are

[7] Additional information on the German microcensus (e. g., questionnaires, sample design) is available at http://www.forschungsdatenzentrum.de/bestand/mikrozensus/index.asp.

asked for the first time in combination with the more detailed information on the migration background. However, by the time this study was finished, data from the microcensus 2007 were not yet available.

SHARE is a cross-national panel database selecting data on health, socio-economic status, and social and family networks of more than 30,000 individuals aged 50 and over (www.share-project.org). SHARE provides unique information on health, including self-reported health, health conditions, physical and cognitive functioning, health behaviour, use of health care services, so-called bio-markers (e. g., grip strength, Body Mass Index (BMI), peak flow), as well as psychological variables (e. g., psychological health, well-being, or life satisfaction). SHARE offers great possibilities for cross-national or cross-cultural comparisons, but as there is no oversampling of immigrants, the share of immigrants in the database is so far not sufficient to analyse this group separatly. Additionally, important variables such as language skills are lacking. Hence, SHARE is not the preferred database for the research question at hand.

KiGGS is a nation-wide representative interview and examination survey for children aged 0-17 years. Data were conducted during May 2003 and May 2006, covering a total of 17,641 participants. It included information on objective health measures of physical and mental health, health behaviour, health care utilisation, social and migrant status, living conditions, and environmental determinants of health (www.kiggs.de). Although KiGGS provides a unique feature to analyse the health of children with migration background, it is not used here, because it does not cover the whole population. In addition, there is already a vast of studies using KiGGS. The analyses based on KiGGS can be found in the May/June 2007 edition of the *Bundesgesundheitsblatt*.

The **federal health survey** of 1998 provides detailed information on health as well as information on nationality, country of origin, and year of immigration. However, as only cross-sectional data are available, it is not possible to control for individual-specific unobserved heterogeneity. Additionally, its cross-

sectional design has the shortcoming that it is not possible to distinguish between changes over time in immigrants' health and differences in the quality of entry cohorts (see Borjas 1985).

The **SOEP**[8], a representative longitudinal survey of currently about 11,000 randomly selected private households with more than 20,000 individuals, is able to meet all three requirements (i. e., identification of immigrants, information on health, and panel design) and it is therefore used for the study at hand and outlined in detail in the following. The SOEP was started in 1984, hence up to now 24 waves (1984-2007) are available. Every year, each household member above the age of 16 is asked questions on a broad range of socio-economic indicators covering 'population and demography', 'education, training, and qualification', 'earnings and income', 'health', 'basic orientation', as well as questions on 'satisfaction with life and with certain aspects of life'. In addition, the head of the household is asked to fill in a household related questionnaire covering household income, housing, and questions on children in the household up to 16.

One of the most important features of the SOEP is the over-sampling of immigrants, especially of two immigrants groups. First, there is an over-sampling of those households whose head is either from Italy, Greece, Spain, former Yugoslavia, or Turkey. Hence, this first group covers the so-called former 'guest workers' and their family members. Second, 'households in which at least one household member had moved from abroad to West Germany after 1984' are over-sampled since 1994/1995. Thus this second group covers to a broad extent the so-called ethnic Germans. As Lampert et al. (2005) noted, regarding nation-wide surveys, the SOEP has the best population-based strategy to include immigrants. In addition, the SOEP includes a broad array of migration-related questions (e. g., nationality, country of origin, year of immigration, language skills, motives for migration, remittances, relatives in the home country, different issues with regard to the attachment to Germany and the country of origin, or remigration intentions).

[8] For more detailed information see www.diw.de/soep, Haisken-DeNew and Frick 2005, SOEP Group 2001, Wagner et al. 2007, and the references therein. SOEP data are available as a "scientific user" file (see Wagner et al. 1993).

Thus, the SOEP offers the unique opportunity to analyse a broad range of migration-related questions.

Additionally, due to the panel structure of the data, it is possible to control for individual-specific heterogeneity, and thus to control, for example, for genetic disposition, risk aversion, environmental exposure in the country of origin, as well as time-constant preferences.

Finally, the SOEP includes a broad array of questions concerning the health status. The SOEP provides information on subjective health (self-rated health and satisfaction with health), and more objective – albeit self-reported – health measures (disability status, chronic illness, and activity limitation). Furthermore, it has been asked for the number of doctor visits, hospital stays and the number of nights in hospital (see chapter 5) as well as for different kinds of health behaviour, e. g., smoking, alcohol consumption, dietary habits, sports activities (see chapter 4). Unfortunately, the questions concerning the different health measures have not been included in every wave (except the question on health satisfaction). Self-rated health has been included in fourteen waves (1992, 1994-2006), chronic illness has only been included in seven years (1984-1989, 1991), activity limitations have been included in twelve questionnaires, but not in succession (1984-1987, 1992, 1995-2001), and disability status has been included in every wave except 1990 and 1993. Since 2002, the SOEP contains also the questions of the so-called short form (SF)-12 questionnaire on a biennial basis. This is one of the most widely used instruments to assess health-related quality of life. It includes questions on mental health, physical health and functioning, general health, pain, vitality, and social functioning. As there are until now only three waves available, the SF-12 is not used in this study. For children born since 2002 there is also information in the so-called mother and child questionnaire on birth-related outcomes like the gestational week at delivery, birth weight, disorders that are confirmed shortly after birth, or utilisation of health care services. However, the number of children born to foreigners or to mothers with migration background is until now to small to analyse them separately.

Overall, the SOEP can meet all of the required attributes and offers the possibility to analyse the chosen questions on migration and health. Thus it is used as the data source for this study.

2 The "healthy immigrant effect"

2.1 Definition of the HIE and differentiation from the "Hispanic Paradox"

Comparative analyses of immigrants' and natives' health have a long history in epidemiological and demographical literature. Two broad categories of studies exist: On the one hand, immigrants and natives are compared in terms of morbidity rates, and on the other hand, immigrants and natives are compared in terms of mortality rates. This distinction is very important – although not very often done – because the findings differ significantly: All studies – morbidity and mortality studies – find an initial health advantage of immigrants compared to natives (which is sometimes also referred to as the "healthy immigrant effect").[9] However, the studies dealing with mortality rates find in general lower all-cause mortality rates for immigrants, which persist more or less over time, whereas the studies dealing with morbidity find generally a worsening of immigrants' health with time of residence in the host country. At first glance this seems conflicting:

> "There is an apparent contradiction between the high level of morbidity and the low level of mortality observed in certain groups of migrants living in Europe" (Uitenbroeck and Verhoeff 2002: 1379).

However, a bad health status (for example due to chronic or rather non-life threatening conditions) has not to lead immediately to a higher mortality. In addition, the findings with regard to mortality have been questioned due to data limitations (see also the discussion in the next section).

This study concentrates on the analysis of the *health status* of immigrants; therefore only a short overview on the studies dealing with mortality is provided in the next section, before the studies dealing with morbidity are outlined in detail.

[9] In this study, the term „healthy immigrant effect" is used for the initial health advantage of immigrants followed by a decline in immigrants' health status. This is explained in detail in the next section.

2.1.1 Mortality Studies: Hispanic Paradox and Salmon Bias

One of the findings, which has attracted much attention in the literature over the past twenty years, is that Latinos in the United States have in general a worse socio-economic profile, are less educated, and have less health insurance in comparison to non-Latinos, but yet they are found to enjoy lower all-cause mortality rates (see, for example, Abraído-Lanza et al. 1999; Khlat and Darmon 2003; Markides and Coreil 1986). This epidemiologic paradox has come to be known as the ***"Hispanic Paradox"*** or the ***"Latino Paradox"***. This finding has also be shown in Europe for Mediterranean immigrants in the Netherlands (e. g., Uitenbroek and Verhoeff 2002), France (e. g., Khlat and Courbage 1996), and Germany (e. g., Razum et al. 1998; 2000), where – following the Hispanic Paradox – it has come to be known as the ***"Mediterranean Paradox".*** For example, Uitenbroek and Verhoeff (2002) investigated the life expectancy of different immigrants groups living in Amsterdam compared to individuals of Dutch origin using civil registry data and life table analysis. They found that life expectancy is lowest among residents of Dutch descent and highest among those of Mediterranean origin. For France, Khlat and Courbage (1996) highlighted the surprisingly low mortality rate among Moroccan immigrants – even after adjusting for missing deaths. For Germany, Razum et al. (1998) compared mortality rates of Turks residing in Germany with those of Turks in Ankara and those of Germans using death registry data and mid-year population estimates from 1980-1994. They found that the age-adjusted mortality rate of Turkish residents is half that of the Germans and also less than half that of the population in Ankara.

The reasons for this paradox are very controversially discussed. Broadly speaking, there are two different groups of explanations:
According to the first group of explanations the paradox is 'real' and caused by factors such as more favourable health behaviours, risk and genetic factors as well as greater family support networks among the group of immigrants (see Abraído-Lanza et al. 1999: 1543; Jasso et al. 2004: 239; Markides and Coreil 1986; Scribner 1996).
According to the second group of explanations the lower mortality rates are 'spurious' and rather determined by the migration process itself (see Abraído-

Lanza et al. 1999: 1543). On the one hand this can be caused by a self-selection process in the way that only healthy individuals take the decision to migrate[10] and this effect holds on. However, this would contradict to the "healthy immigrant effect" – as described above – where a deterioration of immigrants' health over time is found. On the other hand, the lower mortality rates can be caused by an "unhealthy remigration effect" in the sense that immigrants return to their country of origin after they become ill (Pablos-Méndez 1994: 1237; Razum et al. 1998; Weitoft et al. 1999; as well as chapter 3). The latter explanation has come to be known as the *"**Salmon Bias**"*. Uitenbroek and Verhoeff (2002) proposed another explanation related to the registration of age. They emphasised that in some cultures dates of birth are not registered as precisely as in industrialised countries or that some immigrants – in case that there are legal limitations associated with age – over- or understate their age on arrival in the host country (ibid: 1381).

In addition, problems in the process of data collection have to be taken into account (Kohls 2008a; RKI 2008: 32ff.). First, older immigrants tend to have more and more a transnational way of living (see RKI 2008: 32): They have often their residence in Germany, but spend a large part of the year in their country of origin. If they die during their visit in their home country, the death will not be registered in Germany (see RKI 2008: 32). Second, the underlying population used to calculate mortality rates is often derived from extrapolations. This might cause an overestimation of the foreign population. For example, the calculated foreign population in 1987 according to extrapolation of the census population in 1970 was overestimated by 9.4% (see RKI 2008: 32f.). The last population census in Germany took place in 1987, therefore, information on actual miscalculations of mortality rates due to extrapolation mistakes are lacking (see RKI 2008: 33).

The possible explanations have been tested in several studies.[11] For the United States, Abraído-Lanza et al. (1999) used the National Longitudinal Mortality

[10] Marmot et al. (1984) showed for example that mortality rates among immigrants are lower than in their country of origin.

[11] There are two recent reviews, which provide an overview on the large amount of literature regarding the Hispanic Paradox: The review of Palloni and Morenoff (2001) is rather critical, whereby the review of Franzini et al. (2001) is more supportive.

Study (NLMS) to compare mortality rates of U.S.-born individuals, Cubans (who face barriers against return migration), and Puerto Ricans (whose deaths in Puerto Rico are recorded in the national statistics of the United States) to rule out the possibility of a 'Salmon Bias'. Their results showed that neither the 'Salmon Bias' nor a selection of healthier immigrants can explain the paradox, but rather other factors (involving favourable health behaviour) have to operate to produce the lower mortality (see also chapter 4 for a detailed discussion of health behaviour).

In the study of Razum et al. (1998), the authors concluded that their finding of lower all-cause mortality of Turkish immigrants in Germany cannot be explained by a self-selection effect alone as the effect is found to last and to extend as well into the second-generation.

2.1.2 Morbidity studies: The "healthy immigrant effect"

Comparing the morbidity of immigrants relative to that of natives, one of the most striking findings in the literature is the so-called *"healthy immigrant effect"* (HIE). The HIE is said to consist of two parts. According to the first part, immigrants upon arrival are on average healthier than locally born residents. This initial health gap is mostly explained by a self-selection of immigrants (see chapter 2.3.1 for a detailed discussion).

However, according to the second part, this initial health advantage is found to diminish or even to disappear over a relatively short period of time. Hence, the health of immigrants is found to converge to that of the native population or to get even worse (see figure 2.1).[12] The explanations for this deterioration in immigrants' health are discussed in section 2.3.2.

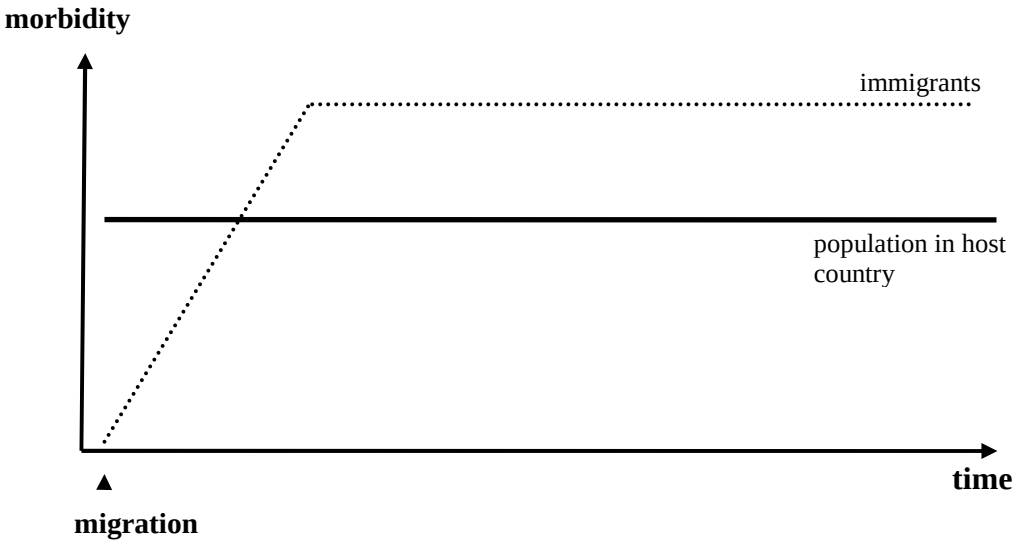
This two-part definition of the HIE is often used in the literature (see for example Deri 2004; McDonald and Kennedy 2004; Newbold 2005a). However, in some studies the HIE is only referred to the initial health advantage, and hence, the subsequent decline in immigrants' health is a

[12] This two-part definition of the HIE is sometimes also used for studies dealing with mortality (for example, Razum 2001). However, as Razum (2001) itself showed, regarding mortality, this trajectory cannot be found in the data, where a persisting 'mortality advantage' is found.

reduction of the HIE (see, for example, Lechner and Mielck 1998). These distinct definitions do not change anything of the content and throughout this study, the two-part definition will be maintained.

The gradient of immigrants' health has been extensively studied in Canada (e. g., Ali 2002; Chen et al. 1996; Deri 2004; Halli and Anchan 2005; McDonald and Kennedy 2004; Newbold and Danforth 2003; Pérez 2002), Australia (e. g. Biddle et al. 2007; Chiswick et al. 2006; Donovan et al. 1992; Kennedy and McDonald 2006), and the United States (e. g. Antecol and Bedard 2006; Frisbie et al. 2001; Jasso et al. 2004; Stephan et al. 1994; Swallen 1997). For Germany, studies related to the HIE are rather rare, with – as far as I know – only two contributions (see Lechner and Mielck 1998 as well as Ronellenfitsch and Razum 2004).[13] A more detailed discussion of the literature can be found in section 2.2.

Figure 2.1: The "healthy immigrant effect"



Note: Razum (2001) used 'mortality' instead of 'morbidity'.
Source: Adapted from Razum 2001: 4

The HIE has been found for many different measures of health, both subjective and more objective health measures. For example, low birth weight (e. g., Balcazar and Krull 1999; Scribner and Dwyer 1989; Vega and Amaro 1994;

13 In contrast there are lots of studies, which deal with mortality rates referring to the HIE in Germany (see Kohls 2008b; Razum et al. 1998; 2000; Ronellenfitsch et al. 2006).

Wingate and Alexander 2006), psychological distress (e. g., Kaplan and Marks 1990), activity limitations (e. g., Cho et al. 2004; Frisbie et al. 2001; Laroche 2000), obesity and overweight (e. g., Cairney and Øsbye 1999; Goel et al. 2004; Gordon-Larsen et al. 2003), mental health (e. g., Ali 2002; Wu and Schimmele 2006), chronic conditions (e. g., Biddle et al. 2007; Chen et al. 1996; Dunn and Dyck 2000; Kennedy and McDonald 2006; Laroche 2000; McDonald and Kennedy 2004; Newbold 2006; Pérez 2002), disability status (e. g., Chen et al. 1996), bed days due to illness (e. g., Cho et al. 2004; Frisbie et al. 2001), or self-assessed health (e. g., Chiswick et al. 2006; Kennedy and McDonald 2006; Laroche 2000; McDonald and Kennedy 2004; Newbold 2005a).

However, the HIE has found to be not unambiguous, but sensitive to the kind of health measure used. For example, for Canada, McDonald and Kennedy (2004) found strong evidence for the HIE in terms of chronic conditions, but only little change with years since migration in immigrants' probability to report fair or poor health. Regarding self-rated health, also Newbold (2005) – using four cycles of the National Population Health Survey (NPHS) – concluded that there are no significant differences between native and foreign born individuals in the ranking of their health as fair or poor. But Newbold (2005) found that native borns were at a lower risk to transition into poor health in comparison to foreign born. In contrast, Deri (2004) – using three cycles of the NPHS – found clear evidence for the HIE in terms of self-rated health in Canada. Despite some of these conflicting results, in general, the existence of the HIE is nowadays well accepted in the international literature.

It should additionally be remarked that the selection according to health depends also on the age at immigration. It has been shown in literature that older immigrants are negatively selected on their state of health (see, for example, Jasso et al. 2004).

2.2 Literature review

Due to the large and ever increasing amount of international literature on the HIE, it is not possible to review all existing studies in detail. Hence, this section aims at providing a general idea on the recent discussion of the HIE and introduces therefore selected studies for the three countries (Australia, Canada, and the United States) where the HIE is lively discussed. Afterwards, the two studies related to Germany are outlined. Thereby, only studies using panel data are reviewed, as in cross section studies the problem of a potential confounding of cohort and assimilation effects arises. This means changes in immigrants' health with duration of residence cannot be separately identified from health differences between different entry cohorts (see Borjas 1985 for this pattern in immigrants' earnings assimilation).

For Australia, Biddle et al. (2007) compared the health status (measured by self-reported chronic conditions) of immigrants to Australia with the native-born population using data from three national health surveys conducted by the Australian Bureau for Statistics in 1989/1990, 1995, and 2001. Their results showed clear evidence for the HIE. Hence, upon arrival, the health of immigrants was on average better than that of native borns, but with duration of residence (in the first 10-20 years), immigrants' health converged to that of natives, and the probability to report a chronic disease increased quickly. However, they found variations between different immigrant groups (with immigrants from a non-English speaking European country, and who arrived before 1970 having a lower incidence for chronic diseases) and for particular chronic diseases (heart disease, diabetes, and asthma). Whereas the incidence of diabetes and asthma has been found to augment with years since migration, Biddle et al. (2007) found only little changes in the incidence of heart disease.
Chiswick et al. (2006) used the Longitudinal Survey of Immigrants to Australia (LSIA) to analyse the determinants of immigrants' health according to different visa categories (economic migration, family reunification, and humanitarian (refugees) migration) as well as changes in immigrants' health over time (using three points of time: At five or six month after arrival, at 18 months after arrival, and at 42 months after arrival). They found – controlled for other socio-economic determinants of health – only minimal differences in

self-reported health between economic migrants and family reunification migrants, but humanitarian immigrants reported a worse state of health. Additionally, they found a deterioration of immigrants' health with duration of residence for all visa categories, although their period under observation is not very long with only 3.5 years. Overall, the inclusion of the visa category in their health status model did not increase the predictive power of the model (again with the exception of refugees). The results of Chiswick et al. (2006) have been confirmed by Kennedy and McDonald (2006) who used the first two waves of the LSIA. In addition to self-reported health, they analysed the prevalence of chronic conditions for which they also found an initial higher prevalence in the group of humanitarian immigrants. As for self-rated health, the prevalence of chronic diseases augmented for all visa categories with duration of residence.

For Canada, McDonald and Kennedy (2004) combined several cross sections of the NPHS and the Canadian Community Health Survey. They found evidence that newly arrived immigrant men and women have a lower incidence of chronic conditions. In addition, they showed that the incidence of chronic conditions converges to native-born levels. For self-rated health, they found only weak evidence for the HIE. Their results have been confirmed by Newbold (2006).

Deri (2004) used the first three cycles of the NPHS. She found evidence for the decline in immigrants' health after controlling for arrival cohorts and survey years. Especially, she estimated for the first ten years in Canada an increase in immigrants' probability to report poor health and activity limitations of about 184 percent, an increase in the probability to report a chronic condition of about 32 percent, and an increase in the BMI of 3.73 percent (ibid: 17). Additionally, Deri (2004) estimated her model separately for men and women. Thereby, she found that the HIE exists for men and women, but, it is reflected in different health measures (for women only in self-rated health and activity limitations) (ibid: 24).

For the United States, Frisbie et al. (2001) used the National Health Interview Survey (NHIS) for the years 1992-1995 to compare the health of Asian and

Pacific Islander adults with U.S. born individuals. They found – using activity limitations and bed days due to illness – an initial health advantage of immigrants followed by a consistently decrease in immigrants' health with duration of residence.

Jasso et al. (2004: 255ff.) is – to the best of my knowledge – the only study which found an increase in immigrants' health with increasing duration of residence in the United States. They used data from the New Immigrant Pilot Survey (NIS-P) – a telephone survey that sampled new legal immigrants to the United States – to estimate the determinants of health selectivity of immigrants and the subsequent changes in immigrants' health. They found that immigrants are positively selected on health. In contrast to the vast of literature, they found additionally an improvement in immigrants' health shortly (six month and twelve month) after immigration. They explained their findings by the fact that immigrants gained a lot in income (they estimated the mean economic gain from migration at about $ 21,000). Hence, this increasing income should affect health in a positive way (ibid: 260f.). It should be taken into account that their results are based on a very short period of time.

Furthermore, a recent study from Rubalcava et al. (2008) is remarkable because it is – at least to my knowledge – the first study which compared the health of migrants with the health of non-migrants in their home country. They used data from the Mexican Family Life Survey (MxFLS) of the years 2002 and 2005 to compare the health states of recent migrants from Mexico to the United States with the health of Mexicans who stayed in Mexico. Health was thereby measured using height, BMI, blood pressure, haemoglobin level, as well as self-rated health (ibid: 79) and it was distinguished between males and females as well as urban and rural residents. Their results showed that rural males were more likely to move if they were not overweight and had normal blood pressure, whereas height, haemoglobin level, and self-rated health according to men of the same age indicated no significant relationship with mobility (see Rubalcava et al. 2008: 80). Urban men were found not to be selected on health. For rural women, the results revealed evidence that women with a normal haemoglobin level, a normal blood pressure, and a good relative general health are more likely to move. For urban women, two health indicators were significant predictors of mobility, namely height and relative

good self-rated health (ibid: 81). However, the authors concluded that they found only weak support for the "healthy immigrant hypothesis".

For Germany, Lechner and Mielck (1998) compared the health status (restriction of daily activities due to poor health, chronic illness, and disablement) of guest workers (coming to Germany until 1973) and natives drawing on data from three cross sections of the SOEP (1984, 1988, and 1992). After controlling for age, they found in 1984 a better health status for the immigrant group for two health measures (chronic illness and disablement). The morbidity of immigrants and natives increased over time, but the increase was faster among immigrants than among natives. Hence, their study revealed evidence for the HIE in Germany for the group of immigrants from former 'guest worker countries'.

Ronellenfitsch and Razum (2004) compared the health satisfaction of immigrants from Eastern Europe (ethnic Germans) with that of a random-sample of age-matched Germans using data from two waves (1995 and 2000) of the SOEP. They found that in 1995, immigrants under the age of 55 had an initial health advantage, thus a significantly higher health satisfaction than Germans. Although immigrants' socio-economic status was found to improve over time, they experienced a much steeper decrease in health satisfaction than native Germans, and for the year 2000, Ronellenfitsch and Razum (2004) could no longer find any significant differences in the health satisfaction between Eastern Europe immigrants and Germans. Hence, also for the group of ethnic Germans, evidence for the HIE is found. On theoretical grounds, this result is rather surprising as the HIE has not been expected to be revealed in the group of ethnic Germans as the immigration of ethnic Germans is said not to occur due to 'normal' selection criteria, but according to German roots (see Kohls 2008a: 18). However, the results should be taken with caution as satisfaction with health is different from the state of health (even from self-rated health).

2.3 Possible explanations for the HIE

2.3.1 First part of the HIE: Immigrants' better health upon arrival

The initial health advantage of immigrants compared to natives has received large attention in the international literature and a range of possible explanations is usually cited.

One of the most cited explanation for the better health status of immigrants upon arrival is related to *selection effects*. This goes implicitly back to Ravenstein (1985) who highlighted that individuals who migrate are on average in better health than individuals who do not migrate. Hence, the idea is that immigrants are positively selected among their origin population such that – ceteribus paribus – healthier individuals are more likely to migrate.[14] The underlying explanation for the positive health selection is that healthier persons are physically or financially more able to migrate (see for example McDonald and Kennedy 2004: 1614). Additionally, in the neoclassical economic theory, migration is seen as an investment, and thus the young, the healthy, and the more educated are in general more able to reap the rewards of this investment, and are thus more likely to migrate.

Although the possible health selection pattern is often mentioned in the empirical findings regarding international migration, Jasso et al. (2004: 240) noted that there has been little formal theoretical investigation of this relationship. They developed a simple theoretical model in which they showed that a person will migrate if the gains of migration exceed the costs of migration (ibid: 240f.). Thereby, the gains and costs of migration can be influenced by monetary factors (e. g., income, costs of moving from one country to another) as well as non-pecuniary factors (such as cultural differences between the sending and receiving country, the quality and availability of good health care, being away from family and friends) (see Jasso et al. 2004: 240f.). In this model, there are several possibilities to include

[14] This idea is closely related to the so-called "healthy-worker-effect" (McMichael 1976), which states that persons which are hired are on average in a better health state than the population as a whole (see Razum and Rohrmann 2002: 83).

health. The predominant thought is that a better health status augments the earnings capacity. As the health status of an individual is seen as an important factor influencing human capital (see Grossman 1972), skill levels are in general higher among healthier individuals. Thus the gains from migration will be higher for healthier individuals and because of that migrants will be positively selected on their state of health (see Jasso et al. 2004: 241).

Regarding this "selection" explanation, lots of confusion has arisen with regard to the respective comparison group. Whereas the HIE states that immigrants are on average upon arrival healthier than locally born residents, the positive selection takes place with regard to the population in the immigrants' country of origin. Hence, it has been criticised that – given large differences in the average health of the population between countries, especially between developed and developing countries, measured, for example, through life expectancy at birth – two different comparison groups are mixed up. Hence, it is argued that a positive selection among the population of the country of origin might not lead to a health advantage in the host country. Though this objection is reasonable, the HIE has been found for immigrants from developing countries as well as immigrants from developed countries (see McDonald and Kennedy 2005: 2469). The health gap has even found to be stronger for immigrants from developing countries. This might be explained by the fact that – as Jasso et al. (2004) remarked – the 'degree' of the HIE is essentially influenced by two factors, namely the geographical and/or cultural distance of the sending and the receiving countries (ibid: 241). The idea is thereby, that the costs of migration are higher for those individuals coming from a country, which is either geographically or culturally more distant. Hence, the more distant the countries, the more positively selected are the migrants – ceteris paribus.

Another possible explanation which could contribute to the initial health advantage of immigrants is the *immigration screening process*: The permission to immigrate requires in many countries a certain level of health (for the United States see, for example, Jasso et al. 2004; Marmot et al. 1984; for Canada see, for example, Chen et al. 1996; Laroche 2000; McDonald and

Kennedy 2004: 1614). However, this screening process is generally said to be too superficial to account for the immigrants' health advantage. For example, for Canada, Laroche (2000) stated that the percentage of applicants to Canada that are rejected due to health reasons is very low, amounting in 1996 only to 1.7% of all potential immigrants, and 86% of them could be considered for future admission (ibid: 54). For Germany, statements with regard to the immigration screening process for guest workers are contradicting. Razum et al. (1998: 301) stated that the health examination of guest workers was too superficial to explain the health advantage of immigrants. Additionally, they pointed out that family members were not examined at all (Razum et al. 1998: 301). In contrast, Mehle (1981) noted that about 9.5% of foreign 'guest worker applicants' were rejected due to health reasons. Also Mattes (2005: 74) quoted a rejection rate of 10%. Hence, according to Kohls (2008a: 18) these examinations amplified the 'normal' selection process.

A further often cited explanation, which could contribute to immigrants' health advantage, is that immigrants might "*under-report" bad health conditions*. This could arise either due to a lack of knowledge about their illness (see McDonald and Kennedy 2004: 1614, 1622), or due to ethnical differences in the perception of health (Jasso et al. 2004; LeClere et al. 1994). However, McDonald and Kennedy (2004) found that under-reporting seemed to be no major factor for the health advantage of immigrants.

Razum and Rohrmann (2002) supposed in a recent study another underlying effect, the so-called "*late-entry-bias*". The idea is that immigrants in a poor health status go back to their home country and therefore remain excluded from studies that usually start enrolling participants only years after the time of immigration (see Razum and Rohrmann 2002).

2.3.2 Second part of the HIE: Subsequent decline in immigrants' health

Whereas the explanation and the empirical findings for the first part of the HIE are quite consistent in the existing literature, the subsequent decline in immigrants' health yield many possible explanations and is widely discussed. Although there is a growing amount of literature which seeks to explain this time path of immigrants' health, the underlying trajectories are not yet fully understood. Again, Jasso et al. (2004) noted the lacking of formal theoretical research for the questions what happens to immigrants' health with increasing time of residence in the host country and they developed a theoretical framework building on the health production function (ibid: 245ff.). The formal model of Jasso et al. (2004) will not be outlined here. Instead, the possible factors influencing immigrants' health will shortly be discussed.

Firstly, a widespread explanation is related to the *socio-economic situation* of immigrants. The link between a low socio-economic status and bad health has been shown in numerous studies. For example, it has been shown that a lower socio-economic status is highly associated with chronic stress (e. g., Collatz 1994), a higher prevalence of cardiovascular risk (e. g., Helmert et al. 1990), higher morbidity (e. g., Bollini and Siem 1995; Elkeles and Seifert 1996; Marmot et al. 1991), and higher mortality (e. g., Geronimus et al. 1996; Helmert 2000; Mackenbach 2003, 2005). The explanations for such socio-economic health inequalities are manifold (e. g., Lampert and Kroll 2005; Mielck 2000; Richter 2005). A low socio-economic profile yield not per se to a worse health status, but rather a low socio-economic status comes along with other factors, which might influence health like housing or working conditions. Additionally, health behaviour is related to the socio-economic position whereby health behaviour which might influence health in a negative way (e. g., smoking, dietary habits) is more associated with a low socio-economic status. Hence, the decline in immigrants' health has been suggested to be explained by the low socio-economic status in the group of immigrants. However, in most of the studies, the HIE has been found even after controlling for immigrants' socio-economic status. Additionally, in many countries in which the HIE has been observed, immigrants' socio-economic status has

improved with time in residence (see, for example, Borjas 1985, 1995; Duleep and Regets 2002; Funkhouser and Trejo 1995; Hu 2000; LaLonde and Topel 1992). This improvement should lead to a better health status with increasing duration of residence in the host country and not to the generally observed health decline.

Secondly, stress is an often mentioned factor which could contribute to a declining health status (see, for example, Kasl and Berkman 1983; Deri 2004: 6; Kohls 2008a). In comparison with natives, immigrants might face *additional stress* due to factors associated with the transition into a new country such as language barriers, cultural differences, discrimination, or a loss of social networks (see Ronellenfitsch and Razum 2004; Vega and Amaro 1994). Additionally, if physical and emotional support systems, which are important to cope with stress situations like unemployment or illness, are lacking in the host country, immigrants might have more difficulties to cope with such situations.

Thirdly, the immigrants' health decline is supposed to be caused by an "*acculturation process*". The idea is that immigrants change their former healthy behaviour[15] and adopt health behaviour with increasing duration of residence, which can have negative effects on health, such as smoking, alcohol consumption, poor dietary habits, or low exercise (see, for example, Antecol and Bedard 2006; Deri 2004; Frisbie et al. 2001; Gee et al. 2003; Jasso et al. 2004; Kasl and Berkman 1983; Marmot and Syme 1976; McDonald and Kennedy 2004; Stephen et al. 1994 as well as chapter 4). One argument against this explanation is that the health decline is observed over a relatively short period of time; the consequences of unhealthy lifestyle choices normally manifest themselves over many years or even decades (see Deri 2004; Newbold 2005a). Nevertheless, at least in the long run, health behaviour can be an important determinant of immigrants' health.

[15] One example for a lifestyle considered to be very healthy is the Mediterranean lifestyle (see Gjonca and Bobak 1997).

Fourthly, a very controversial discussed explanation is related to the *access to and the utilisation of health care services.* In literature, there is no unanimity if immigrants' access to health care services improves with increasing residence in the host country or if immigrants face additional access barriers (due to a general lack of information and experience with the host country's medical care system, language or cultural barriers) which persist more or less over time.

Assuming that access to health care (or rather the use of health services) improves over time, the "reported" health status could be influenced in both directions. On the one hand it can lead to a worsening of the reported health, because pre-existing conditions are now diagnosed and lead to an increased recognition and reporting of conditions (see Jasso et al. 2004; McDonald and Kennedy 2004; Newbold 2005a: 1360). On the other hand it might reduce immigrant/native gaps in preventive health care screening, diagnosis and treatment of health care problems, and thus improve reported health (see Laroche 2000; LeClere et al. 1994; McDonald and Kennedy 2004). This latter aspect would work against a decline in immigrants' health.

Assuming poor access and "under-use" of health services, the "reported" health status could be influenced in both directions again. Whereas relative under-use of preventative health screening and under-diagnosis and treatment of health problems may lead to a worsening of the health status, one could also argue in the same line as above that pre-existing conditions remain undiagnosed and are therefore not reported.

Fifthly, *selective remigration* is supposed for the decline in health. The idea is that if healthier immigrants are returning back home, then the average health of the remaining immigrants will decrease (see Chiswick et al. 2006; Deri 2004; and chapter 3 for a detailed discussion).

Sixthly, it is suggested that the immigrants' decline in health is simply a *regression towards the mean* (see Biddle et al. 2007: 28; Chiswick et al. 2006: 6; Jasso et al. 2004: 248f.). Although it is rather difficult to distinguish the effect of a regression to the mean from other acculturation or environmental effects (see Biddle et al. 2007), two recent studies tried to find evidence for

this argument. However, they found quite different results. Biddle et al. (2007) suggested that the regression towards the mean would operate similarly across all immigrant groups. As they found rather different health profiles for immigrants in Australia from English-speaking and non-English-speaking countries over time, they concluded that this might be more suggestive of health being affected by culture and environment than by simple a regression towards the mean (ibid: 28). In contrast, Chiswick et al. (2006: 25) concluded that the decline in immigrants' health can partly be attributed to a regression towards the mean.

Finally, with regard to self-assessed health it is proposed that immigrants' attitudes towards the constitution of "good" or "poor" health can evolve with years in the host country (see Jasso et al. 2004: 254; McDonald and Kennedy 2004: 1624) as self-reported health might be determined – at least in part – by the cultural perception of illness (see LeClere et al. 1994) as well as it might be assessed in part relative to those in the surrounding environment (see Chiswick et al. 2006: 6). Hence, for example, individuals from countries with a rather low average health status which migrate to countries with a rather high average health status might reassess their health status downward because of a change in the norm, although their "objective" health status has remained the same (see Shaw et al. 1999: 225-226; Sundquist 1995: 133). To shed light on that issue, Chiswick et al. (2006) compared self-reported health for two groups of immigrants to Australia: The first group came from countries with life expectancy at birth above 70.4 years, and the second group came from countries with a life expectancy at birth below 70.4 years. The authors showed that – although the proportion of immigrants which rated their health as 'very good' was higher in the first group than in the second group – immigrants' health deteriorated in both groups to a similar extent. Hence, they suggested that immigrants' decline in health is "not a reflection of changes in norms" (p.: 14). However, in general, only very little is known about how individuals rate their health and the influence of culture is still a rather under-researched area. Nevertheless, regarding the results of Chiswick et al. (2006) and the fact that the HIE has also been found for objective health measures, it can be suggested that there is a "real" decrease in immigrants' health over time.

Given that health and disease result from very complex interactions between genetic predispositions, environment, lifestyle, living circumstances, and personal behaviour (see Bennett 1993), one can assume that none of the above arguments is able to explain the deterioration in immigrants' health over time on its own. Rather an interaction of many processes is likely and all the proposed explanations might influence immigrants' health in one way or another.

2.4 Concluding comments

The HIE is rather difficult to investigate empirically. Health is a very complex and multidimensional issue, and hence it is difficult to untangle the different influence factors. Additionally – although there seems to be rather clear evidence in the existing literature with regard to the existence of the HIE – lots of questions remain and several issues should be taken in mind. Firstly, most of the existing studies differentiate only between foreign born and native born. However, it can be assumed that there is a large heterogeneity in immigrants' health according to their countries of origin. Hence, more studies are needed to shed light on country-specific effects. Secondly, the second-generation has been rather neglected – especially due to data limitations. In addition, in some studies the second-generation is mixed up with natives if the only criteria is the country of origin. This is especially the case in countries where the principle of "ius soli" determines nationality, because then the second-generation cannot be identified by nationality. An identification of the second-generation can – as Jasso et al. (2004) noted – add an intertemporal component and thus it can reveal insides into health trajectories across generations. Thirdly, as noted by Spallek and Razum (2008: 283ff.), it is also essential to compare the health of immigrants with the health of the population of origin to gain insights into the role of the migration process itself on health. This remains an important issue for future studies. Finally, it should be taken in mind that the determinants of immigrants' health are rather under-researched areas. The following three chapters try to contribute to fill this research gap in analysing three potential influence factors on the HIE, namely return migration (chapter 3), changes in immigrants' health behaviour (chapter 4), and access to and the utilisation of

health care services (chapter 5). Thereby, the question how these potential explanations for the HIE influence immigrants' health cannot be answered quantitatively due to data limitations.

3 Return migration and the "healthy immigrant effect"

3.1 Introduction

In this chapter return migration as an additional contribution to the deterioration in immigrants' health is investigated.[16] The idea behind this possible explanation is that the decline in health can additionally be caused by a kind of "statistical artefact" in the way that if healthier immigrants are more likely to remigrate, the average health of the remaining immigrants will decrease. Measures of the "healthy immigrant effect" (HIE) may therefore be biased if a significant fraction of immigrants remigrate back to their home country (or migrate to a third country) and if these immigrants are non-randomly selected by health. In studies examining immigrants' health this idea is quite often pronounced (see, for example, Chiswick et al. 2006: 11; Deri 2004: 19ff.), but – to the best of my knowledge – it has not yet been empirically analysed.

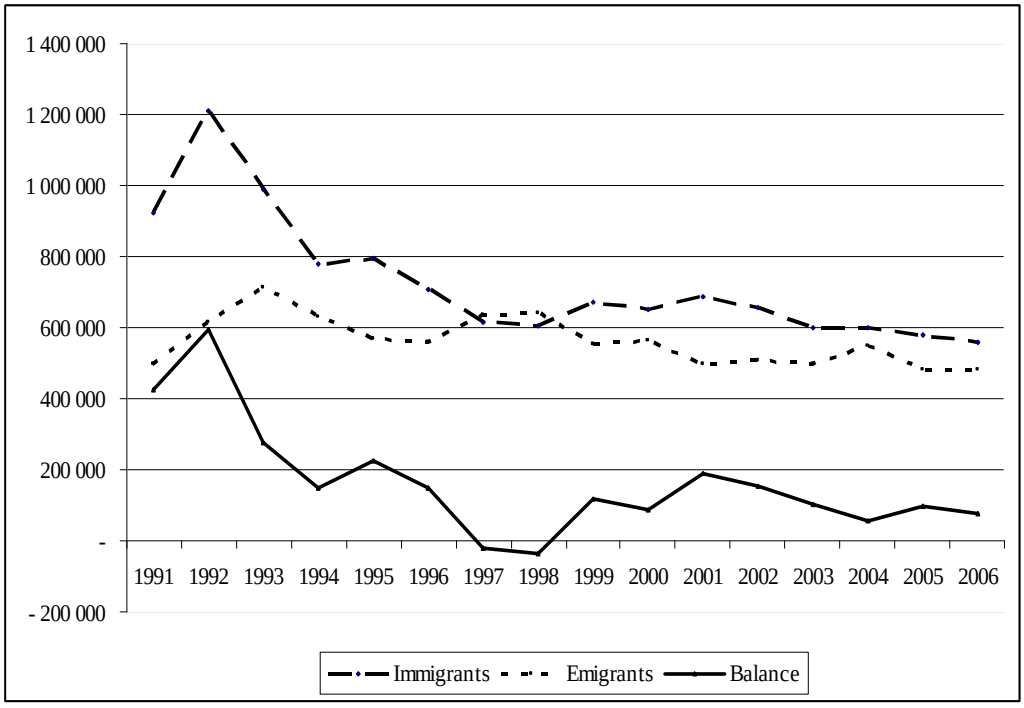
Additionally, in the empirical literature on return migration 'health and health care' are rather neglected issues, and surprisingly little is known about the role of health with regard to return behaviour.

Immigration to Germany is a quite considerable phenomenon (see chapter 1.2). And although net immigration was positive in most years during 1970-2006 (with the exception of 1997-1998 where net immigration was negative), many foreigners have left Germany (see figure 3.1) and out-migration can be regarded as a highly important feature. On average, while around 727,000 individuals have moved annually to Germany, over 561,000 foreigners have out-migrated per year. Although figure 3.1 does not provide the information if out-migration is in fact remigration, it can be assumed that a large proportion of foreigners leaving Germany are actually returning home (see also section 3.4 for a discussion of this assumption).

[16] Return migration and remigration are used synonymously in this study.

Apart from the meaning of return migration as a possible additional explanation for the HIE, a better understanding of return migration in general is important for at least three reasons. First, a deeper understanding of return migration can help assessing the relative success and assimilation of immigrants in the host country. Second, a more accurate research on return migration can help to improve to forecast trends in immigration. Finally, it can be possible to improve calculations of the financial impact of immigration (see Constant and Massey 2003: 632).

Figure 3.1: Immigration and emigration of foreigners in Germany



Source: Federal Statistical Office Germany 2007 (www.destatis.de)

The overall aim of this chapter is to give first insights whether health plays a role in return migration and to investigate whether return migration might contribute to the deterioration in immigrants' health through a selection effect if healthier immigrants are leaving Germany and thus the average health of the remaining immigrants decreases.

The outline of this chapter is as follows. The next section gives a general overview on theories of return migration. Section 3.3 summarises the empirical findings on return migration and provides first theoretical considerations

regarding the possible role of health in return migration. The description of the data and the specification of the econometric model can be found in section 3.4. Section 3.5 presents the estimation results and section 3.6 concludes.

3.2 Theories of return migration

This section gives a short general overview on the theories of return migration. In general, remigration theories are basically in accordance with the theories of migration[17] with three important distinctions: First, given that migration has not taken place in early childhood, return migrants have more accurate information on the host and the home country (e. g., about employment opportunities, cultural and language aspects, or climate). Second, individuals who have once taken the decision to migrate are more likely to move again. Finally, family and non-economic reasons play a more important role in return migration than in migration (see Constant and Massey 2003: 634).

Remigration research basically started at the beginning of the 1960s. Thereby, research focused on mainly three groups of return migrants: First, the return of workers from the United States to Italy, Puerto Rico, and Mexico, second, returners from Australia and Canada to Great Britain, and third, remigrants from Great Britain to the Caribbean (see King 1986: 2f.). In Germany or in the German-speaking region, research on return migration was triggered by the return of the guest workers, and most of the attention was concentrated on the return of Turkish guest workers as they constituted the largest group (see Currle 2006).

In the early literature, migration behaviour has tried to be explained by purely economic motives. Thereby, it has been suggested that wage differentials between the sending and the receiving countries are the driving determinant of migration (see Harris and Todaro 1970; Sjaastad 1962). These neoclassical

[17] For a detailed overview on migration theories see for example Brecht (1994), Cohen (1996), Haug and Sauer (2006), or Kalter (2000) and the references therein. Brecht (1994) provided additionally a summary on return migration (p.: 66-78). An outline of return migration theories is further provided in Currle (2006). Throughout this chapter, return migration is always seen in the sense of voluntary return migration.

static choice models predict that the higher the wage differentials the more individuals decide to migrate. Hence, in these models migrants are only supposed to return due to a change in the economic situation whereby real earnings at home increase relative to those in the host country. However, empirical evidence has shown that return migration occurs despite persistently higher wages in the host country. For example, Carrington et al. (1996) investigated the migration behaviour of southern blacks to the north of the United States between 1915 and 1960 and found that migration increased despite decreasing income differentials. Hence, static models seem to be not compatible with the empirical evidence and thus, return migration theories expanded to dynamic models, whereby the individual has to decide upon the level of consumption and the duration of residence.

In general, three potential return motives have subsequently been suggested in the economic literature: (1) location preferences, which yield a higher utility of consumption in the home country, (2) lower prices in the home than in the host country, which means a higher purchasing power of the host currency in the home country, and (3) human capital acquired in the host country, which might have higher returns in the home country (see, for example, Dustmann 2001).

The first explanation, namely location-specific preferences, has been suggested, for example, by Hill (1987) or Djajic and Milbourne (1988). Hill (1987) developed a life-cycle model of immigrant behaviour to determine net lifetime income, the time spent in the home country and in the host country, respectively, as well as the number of migratory trips. Thereby, he assumed explicitly that immigrants have a preference for home-country residence, which must be weighted against any pecuniary advantage of working in the host country. Hill (1987) concluded that changes in the wages of the home or the host country have different impacts on the participation decision in the foreign labour market. In particular, he drew the conclusion that the participation in the foreign labour market is more sensitive to changes in the home country's wage than to – equal, but opposite – changes in the host country's wage.

Djajic and Milbourne (1988) extended the work of Hill (1987) for risk-averse individuals. They presented an intertemporal utility-maximisation model where they – amongst others – assumed that "migrants have a stronger preference for consumption in their homeland than they do for consumption abroad" (ibid: 337). Hence, remigration can occur despite higher earnings in the host country if the marginal utility of consumption is sufficiently higher in the home country than in the host country.

The second return motive is of importance when the host country's currency has a higher purchasing power in the home country than in the host country, which was first highlighted by Djajic (1989). Also Stark et al. (1997) showed that the optimal point of return depends on the wage rates in the host and the home country, on the level of consumption in both countries, on the capacity to accumulate savings in the host country and transfer them in the home country, as well as on life expectancy. They concluded that in the presence of purchasing power differentials between the host and the home country, immigrants who return home and dissave for consumption in the home country can maximise their utility.

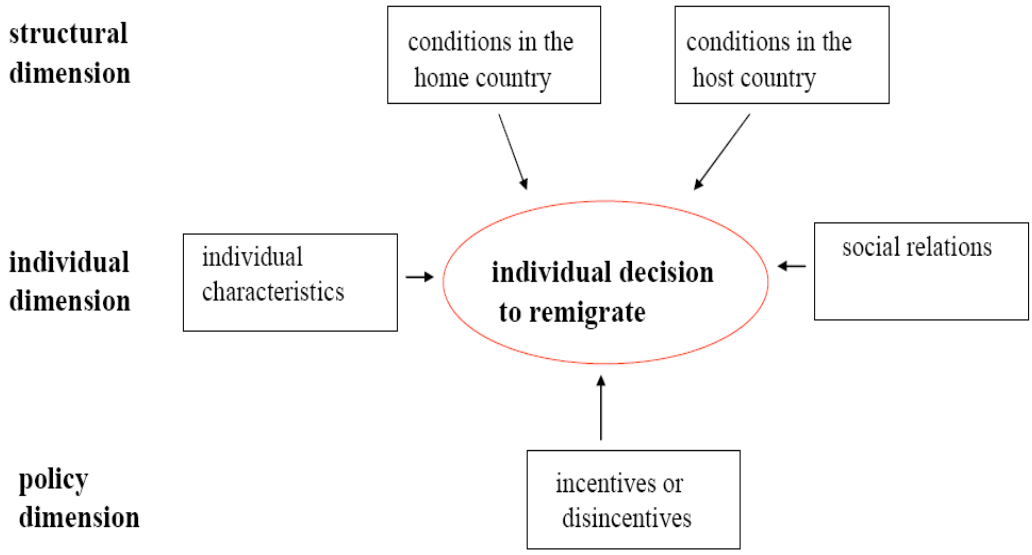
As a third motive to return, a higher return in the home country for the human capital accumulated in the host country has been suggested. This has first been introduced by Dustmann (1995). By means of a life-cycle model, Dustmann (1995) analysed the savings behaviour of immigrants where the return to the home country is included as an endogenous choice variable. He concluded that migrants return back home, because of location-specific preferences, or because the relative price level is higher abroad, and/or because the migrant could enhance his earnings position at home due to the acquired human capital in the host country (ibid: 528). In a more recent paper, Dustmann (2001) extended his previous work and combined all three return motives in a unified framework.

Apart from the above described pecuniary motives, non-pecuniary motives have also been included in some of the economic models as driving factors for return migration. To summarise shortly, the idea is thereby that rational

individuals migrate if the expected present value of total benefits from migration is greater than the total costs of migration, given the information available. Thereby, besides all the pecuniary aspects mentioned, benefits can also be derived from family and cultural ties, climate conditions, or political regimes. Likewise, additional to the direct costs of moving, opportunity or psychic costs (e. g., income forgone while moving, loss of social networks, culture or language barriers) might occur (see, e. g., Constant and Massey 2003: 633).

Nevertheless, economic models have been criticised for neglecting other important influence factors on return migration like social capital or incentives to encourage return migration. Hence, Black et al. (2004) developed a structural model where they incorporated structural, individual, and political determinants of return migration (see figure 3.2). The structural dimension can be divided into political (e. g., security in the home country), economic (e. g., employment), and social factors. Individual factors incorporate, for example, age, gender, or family circumstances. On the policy dimension, especially incentives to encourage return migration are of importance. Regarding the case of guest workers in Germany, one could cite here as an example the ‘law to enhance return migration’ of the year 1983 (see chapter 1.2 for an explanation).

Figure 3.2: Determinants of return migration according to Black



Source: According to Black et al. 2004: 13

Overall, it can be seen that return migration is a very complex and multidimensional issue with a lot of influencing factors that have to be taken into account.

3.3 Previous empirical findings on return migration

The following literature review gives a general overview on previous empirical studies on return migration. Thereby, especially studies that relied on the German Socio-Economic Panel (SOEP) are outlined as these data is also used in the study at hand, and thus ease comparability.[18] In addition – and even more important – reliable data on return migration in other countries are lacking. For example, as Constant and Massey (2002b: 7) noted, there is not any statistic on remigration in the United States.

[18] Some studies dealing with return migration used self-reported expected duration of stay rather than actual return migration (see Steiner and Velling 1994 or Uebelmesser 2005), thus disregarding the fact that intention and behaviour can contradict. Additionally, as Steiner and Velling (1994: 109) noted, observing the expected duration of stay – thus ignoring individuals who have in fact remigrated – could lead to a self-selectivity bias. Hence, all studies dealing with return intentions or expected duration of stay are not presented here.

As can be seen, the importance of non-pecuniary aspects (e. g., family and friends or integration into the host country) and personal characteristics is especially highlighted in the empirical research. The motivation for the choice of covariates used in the subsequent empirical analysis is largely drawn from these previous studies.

Based on the waves 1984-1990 of the SOEP, Brecht (1994) specified a set of event-history models with different covariates to analyse return migration of Southern European guest workers. She found that the probability to return decreases with a higher duration of residence, with age, with the location of the family in the host country, and with a higher integration (measured for example by good German language skills). On the other hand, she showed that the probability to return increases when the immigrant is sending remittances home, for retired individuals, and when family members of the immigrant are living in the country of origin.

Using the first six waves of the SOEP, Schmidt (1994) estimated a set of probit models to examine the return behaviour of immigrants regarding their country of origin, their position in the life-cycle, and their family structure. He found that return probabilities differ with respect to nationality (Greeks and Yugoslavs are more likely to stay), decrease with education and increase whenever close family members have remained in the home country. He also identified the growth of GDP (respectively a large population growth) in the home country as a positive (negative) determinant of return behaviour. With respect to age, he found a convex pattern. However, Schmidt (1994) restricted his study to male blue collar worker between 16 and 64 years.

Velling (1994) – also based on the first six waves of the SOEP – analysed a multinomial logit model, differentiating between three different options: ‘no family reunification’, ‘family follows to Germany’, and ‘remigration’. His results indicate that the older the head of the household and the higher the labour income the less probable is return migration. In contrast, the chance of return migration increases with a bad subjective well-being in Germany as well as if remittances are sent back home. For the variables gender, education, nationality, and years since migration, Velling (1994) found no significant effect.

Using the waves 1984-1997 of the SOEP, Constant and Massey (2003) showed by means of a multinomial discrete time event history analysis that the return probability depends only weakly on human capital characteristics, but strongly on the social and economic attachment to the country of origin or to Germany, respectively. They found that the probability to remigrate decreases with good German language skills, with higher occupational prestige, with the location of the spouse and children in Germany, as well as for immigrants with German nationality or for immigrants who 'feel German'. In contrast, the probability to remigrate increases if the spouse or children are located in the home country or if remittances are sent home. Furthermore, their results showed that employment is a very important influence factor for return migration and immigrants who are registered as unemployed or who are not working are more likely to return. With regard to gender, they could not detect a significant effect.

Dustmann (2003) developed a model in which parents have paternalistic preferences. Using data of 14 waves of the SOEP and including information on intended and realised return migration, he suggested that return plans of parents differ depending on the sex of their children. Whereas the home country is judged more beneficial for daughters because of a "better" cultural environment, the host country is preferred for boys due to better economic prospects. The differences between boys and girls are larger for families which are culturally more distinct.

Pohl (2005) analysed the return behaviour of immigrants using waves 1984-2003 of the SOEP and found that the return probability of high-educated foreigners is significantly inferior in comparison to that of less educated foreigners. However, given that return migration took place, high-skilled migrants showed shorter stays than low-skilled migrants. In contrast, a more recent study by Gundel and Peters (2008) found that highly skilled immigrants are more likely to return than less skilled immigrants. They used waves 1984-2006 of the SOEP and applied a Cox proportional hazard model. Additionally, Gundel and Peters (2008) showed that immigrants from countries with free labour movement agreements with Germany showed a higher likelihood to return than individuals from other countries.

These conflicting results with regard to the skill level of immigrants have also been found for studies in other countries (see Constant and Massey 2003: 634ff. for an overview). Borjas and Bratsberg (1994) tried to explain these conflicting findings, and concluded that the selection process of return migration depends on the initial type of selection that has been produced by migration.

> "…return migration intensifies the type of selection that generated the immigrants flow in the first place. In other words, if the immigrant flow is positively selected, so that immigrants have above-average skills, the return migrants will be the least skilled immigrants. In contrast, if the immigrant flow is negatively selected, the return migrants will be the most skilled migrants" (Borjas and Bratsberg 1994: 25).

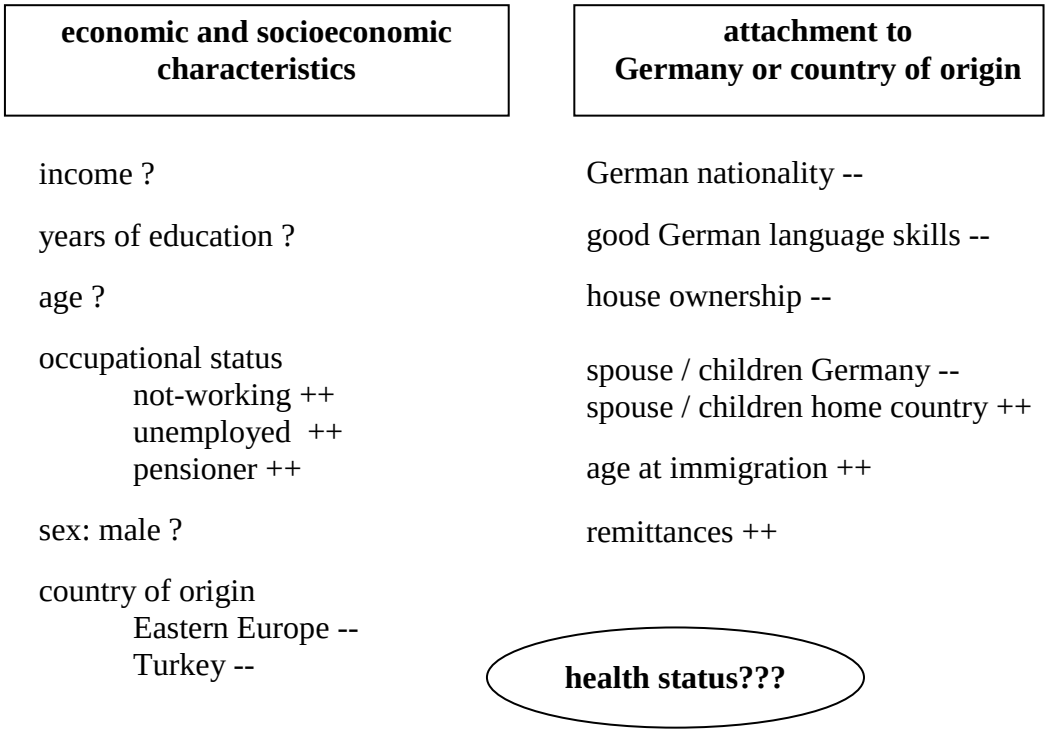
As the theoretical and empirical studies showed, there are lots of factors influencing return migration. Constant and Massey (2003) concluded the results from a review of the literature on return migration in the following way:

> "If a synopsis can be gleaned from the literature on return migration, it is that return migration is a rather complicated socio-economic process whose degree and direction of selectivity varies by national origin and depends on the selectivity of the original immigration, conditions in sending and receiving countries, socio-economic characteristics, and other unknown and perhaps unobservable factors." (ibid: 636).

To summarise these previous empirical findings, figure 3.3 gives a short overview of the factors influencing return migration and the hypothesis in which direction these factors might influence return migration. For some of the variables, the influence cannot be hypothesised clearly as the empirical and theoretical considerations are ambiguous.

All these variables are used as covariates in the empirical analysis and discussed in detail in section 3.5.

Figure 3.3: Factors influencing return migration: Hypotheses



Note:
--: decreasing probability to remigrate,
++: increasing probability to remigrate,
?: effect not clear

Source: Own compilation

As can be seen from the above literature review, health is rather disregarded in the empirical literature on return migration. To the best of my knowledge, there is only one qualitative study of Turkish remigrants in which health as a determinant of return migration is discussed: Razum et al. (2005) interviewed 44 Turkish men in Turkey, who had lived in Germany for several years before they returned back to Turkey. The reasons for their return migration have been very varying and included, among others, better climate in the home country, lifestyle (e. g., lower stress in the home country; moral), family and friends, as well as bad working conditions.

The following suggestions try to derivate the influence of health on return migration from a theoretical point of view.

Assuming that health plays the same role for return migration as it does for migration,[19] one would expect that a good health status increases the probability of return migration. Regarding health care services, this supposition can be supported because especially individuals in a poor state of health can benefit from the availability and almost free medical treatment in Germany, and therefore individuals in poor health are supposed to be more likely to stay.

However, the suggestion that healthier persons might have a higher probability to return home, seems to contradict with the proposed "unhealthy remigration effect" in mortality studies (see chapter 2.1.1 for a discussion). Razum et al. (1998), for instance, used death registry data and mid-year population estimates and found that the age-adjusted mortality rate of Turkish residents is half that of the Germans, and also less than half that of the population in Ankara. As a possible explanation they proposed an "unhealthy remigration effect" in which "socially successful migrants with a lower mortality risk stay in the host country while less successful ones return home even before becoming manifestly ill" (Razum et al. 1998: 297). However, given an available and almost free medical treatment of conditions like cardiovascular diseases in Germany, Razum et al. (1998) themselves neglected the plausibility of remigration of severely ill immigrants as can be seen from their statement cited above that immigrants return home before they fall sick.

Additionally, in the qualitative study of Razum et al. (2005) many of the interviewed Turks judged the German climate as harmful to health. If it is that individuals hold the climate responsible for their rather poor well-being or for a deterioration of their health status, this could maybe more support a returning of individuals in a poor health status.

Finally, it has been suggested that ill migrants return back home when their social networks – which they need especially in times of illness – remained in the home country. However, as Kohls (2008a: 21) remarked, an increasing duration of residence in the host country augments the probability that family and friends live in the host country as well. Hence, in this sense, a return

[19] According to the neoclassical theory the young and the healthy are more likely to migrate than older and less healthy individuals. This argument is usually used to explain the initial health advantage of immigrants (see chapter 2).

because of illness seems not reasonable if social networks exist in the host country.

Overall, as it has been shown, return migration is a quite complex and multidimensional process, and a wide array of factors has to be taken into account. Therefore, a clear prediction of the role of health in return migration is a priori not possible.

3.4 Data and estimation method

3.4.1 Data

The data used are drawn from thirteen waves (1993-2005) of the SOEP (see chapter 1.4 for a detailed description of the SOEP). To analyse return migration, information on panel attrition is needed. 'Going abroad' is one form of panel attrition, other forms include mortality, refused participation, or unsuccessful tracking.[20] The SOEP is especially suitable for analysing return migration probabilities because lots of effort is done to investigate the causes of panel attrition in a "whereabout-study". This means one can distinguish between households moving in Germany and households going abroad. This is essential for analysing return migration behaviour. In this analysis "going abroad" is defined as return migration. Moving on to a third country is therefore not considered, because it is not possible to distinguish between 'return migration' and 'migration to a third country'. This might be seen as a rather hard assumption. However, in terms of the possible bias of the HIE, it does not matter if the individual moves back home or if the individual moves to a third country. Additionally, as Dustmann (2003) noted, 'going abroad' "is most likely to correspond to a return migration, if the respondent is foreign born" (p.: 820). This assumption can also be supported taking advantage of a special question in the SOEP, which has been asked in 1993, 1996, 1997, and 1998: "Would you consider moving to another country? If yes, which one?". It can be shown that more than 95% of those immigrants who considered moving

[20] Overall, the panel attrition rate of the SOEP is rather moderate (for more detailed information see Spieß and Kroh 2004).

to another country and later on left the panel had answered before that they wanted to move back to their country of origin.

3.4.2 How to measure health?

One question of utmost importance for this analysis is how to measure the health status of the individuals. As a first step in this analysis, self-rated health is used as a subjective health measure (see chapter 1.4 for an overview of the different health measures included in the SOEP). As the question with regard to self-rated health has not been asked in 1993, the values for 1993 are imputed by using information from 1992. Hence, the return migration of waves 1993-2005 can be studied, and thus the use of self-rated health offers the possibility to study a timeframe of thirteen years in series.

The increasing usage of subjective health measures gives rise to a discussion in the literature about its validity. On the one hand, self-rated health has been shown to be a valid and reliable indicator of overall health (see Butler et al. 1987) and a valid predictor for mortality (see Idler and Benyamini 1997; Schwarze et al. 2000). Additionally, Burström and Fredlund (2001) showed that the predictive power of self-rated health is stable across different socio-economic groups and according to Chandola and Jenkinson (2000), self-rated health is also a valid measure across different ethnic groups. However, it is clear that there cannot be a perfect relationship between self-rated health and mortality, because not every chronic illness, which affects self-rated health, is life-threatening (see Jürges 2005).

On the other hand, there is huge concern that self-rated health is prone to measurement error, because the perception of health is assumed to be related to age, socio-economic status, ethnicity, or other characteristics. The idea is that individuals may have different response styles or different reference points against which they judge their health, and that this rating behaviour varies systematically with the respondents' characteristics. Hence, for immigrants, it could be that immigrants change their self-reported health not due to a "real" change in their state of health, but due to a changing of the surrounding norm (see Sundquist 1995: 133 or Shaw et al. 1999: 225-226 as cited in Chiswick et

al. 2006: 6), or that their perception of health is influenced by cultural characteristics. This source of measurement error has been termed in different ways: 'state-dependent reporting bias' (see Kerkhofs and Lindeboom 1995), 'scale of reference bias' (see Groot 2000), or 'response category cut-point shift' (see Murray et al. 2001). For example, it has been shown that unemployment affects general life satisfaction (see, among others, Winkelmann and Winkelmann 1998), and as Jürges (2005) noted, "this might influence response behaviour in surveys, leading respondents to a more pessimistic view of their own health than they might otherwise have. If this is the case, effects of unemployment on health will be overstated" (ibid: 2). Hence, it is assumed that "true" health is a latent and unobservable variable. When responding to survey questions, the individuals are assumed to project this "true" health onto a scale. Then the researcher rescales these answers if there is evidence that the response styles or reference points differ between individuals. However, an often neglected point of view is that all these studies, which analyse potential measurement error in self-rated health and rescale the respondents' answers, rely on one fundamental assumption: There has to be something like "true" and "objective" health. However, in literature, there is until now no consistent definition of health. One often used and cited definition comes from the World Health Organisation (WHO): "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO 1948). In that sense, health has always a subjective character. Taking the example from above, being unemployed is for most individuals a stress situation. This can cause, for example, mental problems, especially if the unemployed individual has not enough resources to cope with this situation. Thus, it is possible that the individual rate his/her health worse than pure objective indicators would suggest, because they usually take mental and social well-being not into account. For immigrants, it is therefore suggested that subjective health can be seen as a very important health measure, because immigrants might face additional stress due to language or cultural barriers, or due to the loss of social networks, which can influence their perception of health, and which is not measurable with objective health measures. Nevertheless, interpreting the results with regard to

self-rated health, one should bear in mind that the perceived health status does not necessarily correspond to medically diagnosed states.

Another potential problem is that there might be an endogenous relationship between self-rated health and return migration. A usual way to deal with endogeneity problems is to implement an instrumental variable (IV) estimator. Thereby, the inherent problem is to find adequate instruments for the endogenous variable, hence, in the case at hand, for self-rated health. In literature, more objective health measures like hospital stays or the number of days absent from work are sometimes used as instruments (see, for example, Jäckle 2007). However, instrumental variable estimation has the drawback, that the assumption of independence between the unobserved effects and the instruments cannot be tested. Hence, in this study, no instrumental variable estimator is implemented, but the estimation is additionally conducted using disability and hospital stays, respectively, as more objective health measures. It can be assumed that disability and hospital stays are less prone to endogeneity problems. Additionally, disability and hospital stays might suffer less than self-rated health from measurement error. However, it should be taken in mind that – as Gee et al. (2003) noted – the willingness to report health problems can be affected by cultural factors as there may be differences in the fundamental concepts of health and illness. Hence, not only self-assessed health might be affected, but also objective health measures, if they are self-reported.

3.4.3 Sample design

The unit of analysis is the individual. The panel design is unbalanced. Each year all individuals above the age of 16 and not born in Germany are included. Individuals born in Germany are excluded, because – per definition – someone who has not migrated cannot remigrate.

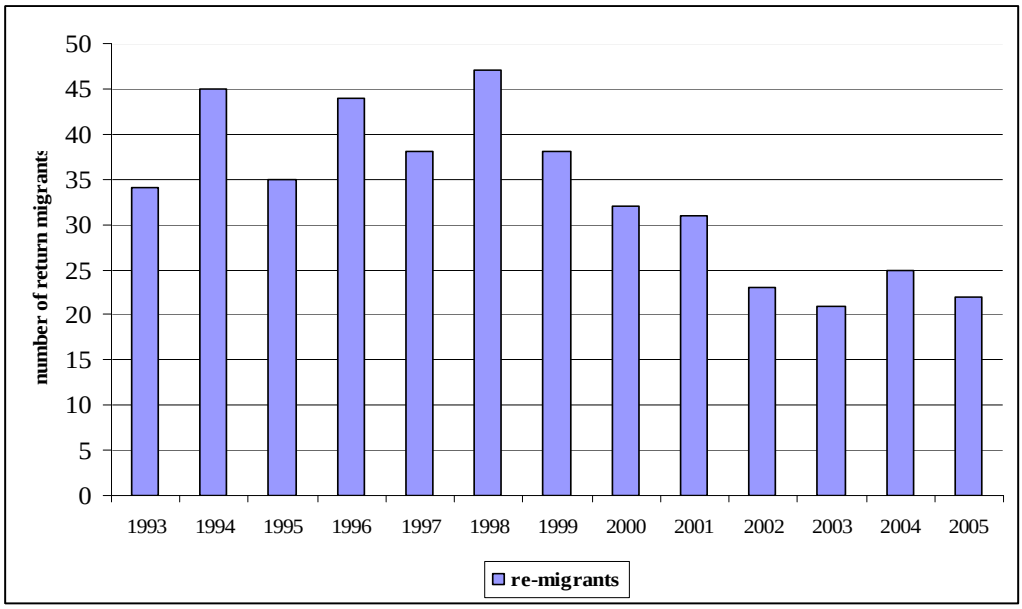
The longitudinal sample consists of 4,426 individuals of whom are 2,255 men and 2,171 women. 822 individuals are in the panel for all the years. Overall, the sample is composed of 31,639 person-years.

3.4.4 Dependent variable

The dependent variable is created as a dummy variable, which takes the value one if someone has gone abroad and the value zero otherwise. That means 'staying in the panel', 'refused to answer', 'died', and 'lost to follow-up' are coded as zero. This implicitly assumes that those individuals lost to follow-up are staying in Germany. As the ,lost to follow-up rates' of sample A and sample B are quite similar, this assumption can be supported.[21]

The sample consists of 435 return migrants. Figure 3.4 shows the number of return migrants according to the year. As can be seen, the number of return migrants decreases over time.

Figure 3.4: Number of return migrants in each wave



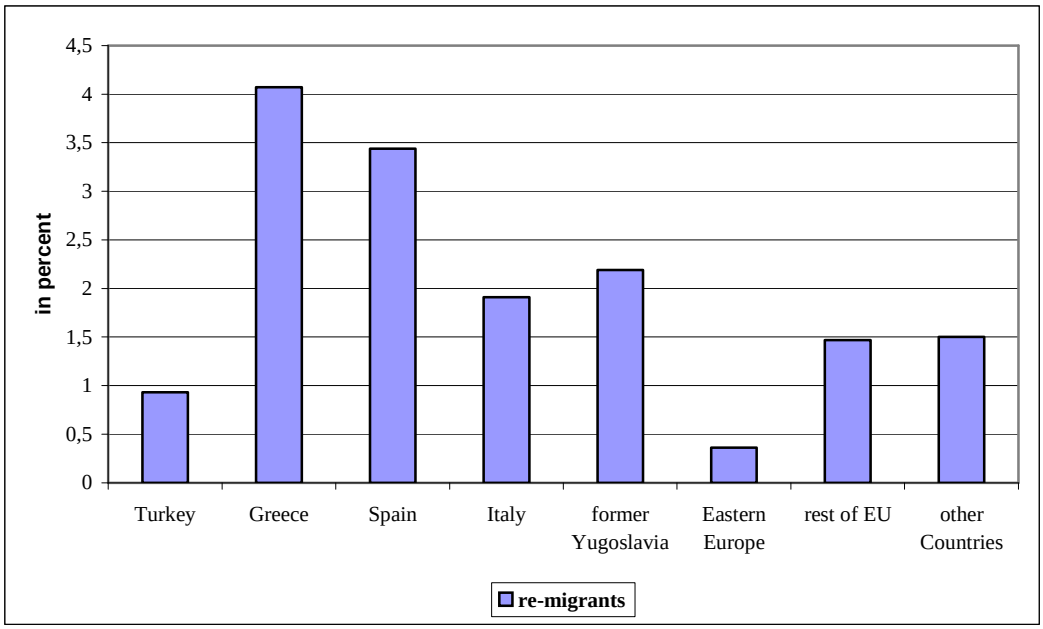
Source: Own calculation, waves 1993-2005, not weighted

Figure 3.5 shows the percentage of immigrants according to the country of origin. For example, 0.3% of all Eastern European immigrants in Germany and about 2% of all Italians in Germany returned home. Overall, Greeks with 4.05% and Spanish with 3.6% have the highest return rates, and immigrants from Eastern Europe have the lowest return rate with only 0.3%. This is not

[21] Sample A consists of all households whose head is either German or another nationality than those in Sample B. Sample B consists of all households whose head is either Turkish, Italian, Spanish, Greek, or Yugoslavian.

surprising because immigrants from Eastern Europe belong virtually all to the group of ethnic Germans who are supposed to intend to stay in Germany.

Figure 3.5: Return migration according to country of origin (in percent)



Source: Own calculation, waves 1993-2005, not weighted

3.4.5 Independent variables

The following explanatory variables, which have been discussed in the theoretical or empirical literature as potential determinants of return migration, are included in the regression[22]: A dummy variable for *sex* (taking the value one for men, and zero otherwise); three dummy variables for *age* (one taking the value one for the age category 26-50 years, one taking the value one for the age category 51-65 years, and one that takes the value one if the respondent is older than 66, with age of 16-25 acting as reference group); dummy variables for the *country of origin* (i. e., one dummy variable respectively for Turkey, Greece, Italy, Spain, former Yugoslavia, Eastern European countries, and other

[22] Some of the potential determinants of return migration as 'contact to Germans' and 'relatives and friends in Germany' have to be expelled from the analysis because the questions concerning these issues have only been asked in a few waves.

countries, with other EU-countries acting as reference group)[23]; a dummy variable for *German nationality*; two dummy variables for *marital status* (i. e., one dummy variable indicating if the married spouse lives in Germany, the other one if the married spouse lives in the home country, with being separated, widowed, or single acting as reference group); two dummy variables for having *children* (one dummy variable for having children under the age of 18 in Germany, the other one for having children under the age of 18 living abroad); *years of education*; *occupational status* (i. e., dummy variables covering the following possibilities: 'Non-working', 'jobless', 'training', 'self-employed', or 'pensioner' (with 'working' acting as reference group); a dummy variable for *house ownership*; logarithm of *household pre-government income*; logarithm of *transfers;*[24] logarithm of *pensions*[25]; logarithm of the size of the household;[26] *age at immigration*; a dummy variable indicating if the individual sends *remittances*, and a dummy variable for having very good or good *German language skills*; and a set of dummy variables for the year to capture period effects (i. e., one dummy variable for each wave). The variable of special interest, *self-rated health*, is measured by a five-point scale question: "How would you evaluate your present health? Is it (1) very good, (2) good, (3) fair, (4) poor, or (5) very poor?" Five dummy variables are constructed with 'very good self-rated health' acting as reference group.

[23] To distinguish between immigrants from the specific former guest worker countries, ethnic Germans (or Eastern European immigrants), immigrants from all other countries, and immigrants from European countries is quite common in literature.

[24] Transfers include all household public transfers of all individuals in the household aged 16 years and older, e. g., housing allowances, child benefits, government student assistance, subsistence assistance from the Social Welfare Authority, maternity benefits, unemployment benefits, unemployment assistance, as well as unemployment subsistence allowance.

[25] House ownership, income, transfers, pension, and the size of the household are variables covering the household context. Therefore, these variables can be seen as a first proxy for household interdependencies (see section 3.5.5).

[26] Schwarze (2003) showed that the inclusion of logarithm of income and logarithm of household size is more flexible than using equivalence income, because it is not necessary to make any assumptions about the equivalence scale.

3.4.6 Characteristics of the sample population

To gain a first impression, table 3.1 presents selected characteristics of the sample population for 1993 and 2005 to show how the sample varied over time. This is especially of importance as the SOEP has been enlarged in 1994/1995 by "subsample D", which covers households in which at least one household member has moved to Germany after 1984. Table 3.2 presents the selected characteristics of the return migrants in the sample. Most of the existing studies are gender blind and consider only male immigrants. Other studies included women, but did not distinguish in the empirical analysis between men and women. However, apart from the level of return migration, determinants of return behaviour and their effects can vary by gender. This can especially be the case if it is that the return decision is taken by the head of the household, which is in most of the cases the man. This motivates a separate analysis for men and women.

In 1993, there are slightly more men than women in the sample. In 2005, this ratio is reverse, which could be due to the fact that more men than women remigrated (57% to 43%, respectively).

Whereas the percentage of immigrants from guest worker countries decreased– with the highest decline for Turkish men (35% to 24%) – it increased for all other immigrant groups – with the highest rise for immigrants from Eastern Europe (12% to 42% for men and 18% to 49% for women). This high increase can – to a large part – be explained by the enlargement of the SOEP in 1994/1995 by "subsample D" as this sample includes basically ethnic Germans.

It is interesting to note that by 2005 nearly every second immigrant has German nationality, whereas in 1993, the fraction has been only around 11% for men and 15% for women. Return migrants have only to a very small percentage German nationality, which is in line with the assumption that naturalisation signifies also a higher attachment to Germany and thus decreases the probability to remigrate.

The majority of immigrants are married and live with their spouses in Germany. In 1993, it is only a very small percentage that has a spouse in the home country and in 2005 neither men nor women immigrants have still a

spouse living in the home country. Similarly, the percentage of immigrants who have children living in the home country is low. This can be either due to family reunification, or due to the return migration of individuals whose family remained in the home country.

Regarding educational status the average lies around 9.8 years of education. There is a slight increase by about one year in 2005. There is no difference in educational status for remigrants: On average, remigrants have around 10 years of education.

Concerning occupational status, there is a great difference between men and women immigrants, reflecting more traditionally labour market roles whereby women do not participate in the labour market. In 1993, only 3% of men reported not to work, whereas 33% of women. This ratio does not change in 2005. Remarkable is further the ratio of pensioners which doubled from 1993 to 2005 for men and women. In the group of return migrants, around 25% of men and 50% of women are either non-working or jobless and around 25% are pensioners.

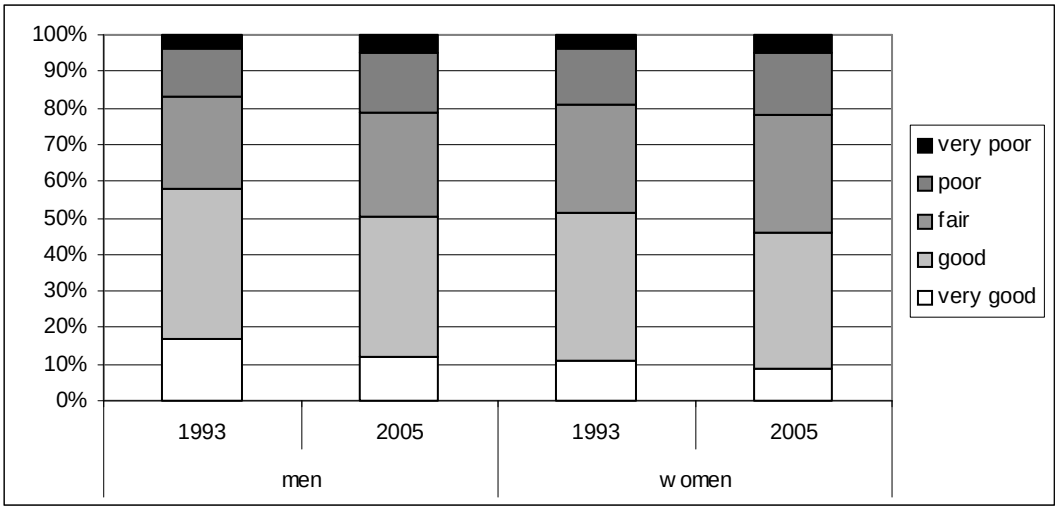
The percentage of home owners increased from 16% to 30%. The ratio of immigrants reporting to send remittances back home thereby dropped from around 28% to 12%. In 1993, a large fraction of immigrants (44% for men and 32% for women) assess their German language skills as very good or good. This fraction is for both men and women increasing to about 60%. All these figures show an increasing attachment to Germany over time.

Men and women are indistinguishable with regard to their age at immigration. Age at immigration does only slightly increase from 21.6 to 24 years for men (and from 21.9 to 24.6 for women). On average, the age at immigration for remigrants lies between 26.8 (men) and 27.3 (women) years.

Men as well as women rate on average their state of health in 2005 worse than in 1993. This can be due to the aging of the sample from 1993 to 2005. Additionally, part of this decline in health could also be due to the return migration of individuals, which rated their health as very good. This could be especially for male remigrants as around 17% of them report their health as very good, and around 37% as good, whereas female remigrants assess their health status worse (only 6% report a very good and around 30% a good health status) (see figure 3.6).

Overall, women rate their health status in 1993 as well as in 2005 slightly worse than do men. This 'worse rating' of women is an often reported phenomenon in the existing literature, yet a generally accepted explanation for this finding is so far lacking (see, for example, Andersen et al. 2008: 261; Pol and Thomas 1992: 298-299).

Figure 3.6: Changes in health status over time



Source: Own compilation, waves 1993 & 2005

Table 3.1: Descriptive characteristics of the sample in 1993 & 2005

variables		1993		2005	
		men	women	men	women
sex		0.53	0.47	0.48	0.52
age		42.7	41.4	47.4	46.5
		(13.8)	(13.7)	(15.0)	(14.9)
country of origin	Turkey	0.35	0.33	0.24	0.21
	Greece	0.11	0.11	0.05	0.04
	Italy	0.17	0.13	0.10	0.07
	Spain	0.07	0.06	0.02	0.02
	former Yugoslavia	0.16	0.18	0.11	0.12
	other EU-countries	0.02	0.02	0.07	0.07
	Eastern Europe	0.12	0.18	0.42	0.49
	other countries	0.03	0.04	0.06	0.06
German nationality		0.11	0.15	0.46	0.49
married	spouse in Germany	0.77	0.80	0.79	0.75
	spouse abroad	0.03	0.01	0	0
children	in Germany	0.58	0.59	0.49	0.48
	in home country	0.05	0.04	0.04	0.02
years of education		9.8	9.3	11.0	10.8
		(2.1)	(2.2)	(2.5)	(2.8)
occupational status	non-working	0.03	0.33	0.02	0.26
	jobless	0.08	0.07	0.13	0.08
	training	0.04	0.04	0.04	0.04
	self-employed	0.05	0.02	0.06	0.02
	pensioner	0.09	0.08	0.20	0.17
	working	0.70	0.44	0.50	0.41
own dwelling		0.16	0.17	0.30	0.31
income		18216.7	16889.2	19359.3	18233.7
transfers		1842.8	1777.2	4483.4	4268.5
pension		1156.0	1252.5	3429.3	3669.9
remittances		0.28	0.15	0.12	0.10
German fluency		0.44	0.32	0.61	0.59
age at immigration		21.6	21.9	24.0	24.6
		(10.6)	(11.0)	(13.5)	(14.2)
self-rated health	very good	0.17	0.12	0.11	0.09
	good	0.41	0.38	0.40	0.37
	fair	0.25	0.28	0.29	0.32
	poor	0.13	0.16	0.15	0.17
	very poor	0.04	0.05	0.04	0.05
# observations		1,142	1,002	1,107	1,189

Standard deviation in parentheses
Source: Own calculation; wave 1993 & 2005 SOEP, not weighted

Table 3.2: Descriptive characteristics of return migrants

variables		men	women
sex		0.57	0.43
age		47.7	47.8
		(15.4)	(15.1)
country of origin	Turkey	0.20	0.15
	Greece	0.18	0.23
	Italy	0.15	0.16
	Spain	0.08	0.10
	former Yugoslavia	0.21	0.22
	other EU-countries	0.04	0.07
	Eastern Europe	0.10	0.09
	other countries	0.08	0.02
German nationality		0.06	0.05
married	spouse in Germany	0.64	0.77
	spouse in home country	0.08	0.02
children	in Germany	0.34	0.33
	in home country	0.06	0.06
years of education		10.0	9.3
		(2.4)	(2.6)
occupational status	non-working	0.09	0.38
	jobless	0.16	0.12
	training	0.04	0.03
	self-employed	0.05	0.03
	pensioner	0.25	0.22
	working	0.37	0.20
own dwelling		0.09	0.11
income		16069.4	16368.1
transfers		2921.8	2859.9
pension		3347.4	3926.7
remittances		0.24	0.14
German fluency		0.29	0.25
age at immigration		26.8	27.3
		(10.4)	(11.9)
self-rated health	very good	0.17	0.06
	good	0.37	0.30
	fair	0.24	0.38
	poor	0.17	0.20
	very poor	0.05	0.06
# observations		249	186

Standard deviation in parentheses
Source: Own calculation, waves 1993-2005 SOEP, not weighted

3.4.7 Econometric specification

The purpose of this analysis is to model the individual choice behaviour of migrants facing two options: Returning home or staying in Germany. A wide-spread approach in literature to analyse return migration is event-history analysis (EHA)[27] (see, for example, Brecht 1994; Constant and Massey 2003). EHA is best suited to analyse the duration of time until a special event – in the case at hand return migration – occurs. It is also possible to estimate the risk of the event occurring based on values of a set of independent variables, which is done in this chapter. Return migration is a non-repeatable one-way transition event, that means the event occurs only at discrete[28] points of time, and the transition from one state (living in Germany) to another state (going abroad) can only occur once for each person. In the case of discrete time, the EHA corresponds to a binary choice problem with the inclusion of dummy variables for time, and can be modelled using either logit or probit models (see Beck et al. 1998).

The event does not have to occur for every person. The data are left-truncated and right-censored. Right-censoring has the consequence that some individuals who are coded as stayers in the analysis might return home to a point in time we cannot observe yet. Hence, these individuals are coded erroneously as non-returners (see Dustmann 2003). It is assumed here that right-censoring is random, so that the time between the beginning and the end of an observation is independent from the timing of events (following, for example, Constant and Massey 2003: 637).

Left-truncated means that an individual has been at risk and has already remigrated before the panel has been started. This implies that the sample is choice based: Those who have a higher propensity to remain in Germany are also more likely to be observed when the panel (i. e., in 1984), and respectively the sample used in this study (i. e., in 1992), has been started. Therefore, the sample suffers from an oversampling of those immigrants with

[27] For a detailed outline of event history analysis see, among others, Allison 1992, Blossfeld and Rohwer 2002, or Yamaguchi 1991.
[28] The event can occur at every point in time, but as only yearly information is available, the information is measured discrete.

long durations of residence in Germany (see Dustmann 2003 or Steiner and Velling 1994). As Dustmann (2003) noted, any modelling of the process of choice based sampling would require additional assumptions. As such a modelling is behind the scope of this study, it will only shortly be discussed what effects this might have on the estimates of the parameters of interest using the same framework as in the classical selection bias problem and following Dustmann (2003). Assuming that a poor health status reduces the return probability of immigrants, the health status of an individual affects sample selection, and those with a good state of health are less likely to be in the sample at any point in time. Hence, in any wave observed, those individuals with a good state of health must have a larger propensity to stay. Therefore, it is possible to argument that the estimated health coefficient in the subsample is smaller than the coefficient of the total sample would be and the effect of health is underestimated.

The panel structure of the data offers the possibility to take unobservable time-constant individual-specific heterogeneity into account. To the best of my knowledge there is so far – with the notable exception of Steiner and Velling 1994 – no other study of return migration which accounts for individual-specific heterogeneity. Accounting for individual-specific heterogeneity is of importance as, for example, immigrants could have a "specific preference" for living in the home country or for living abroad which cannot be captured by economic or social observables. In general, panel estimators "differentiate out" this individual-specific heterogeneity while still allowing for it. To account for individual-specific heterogeneity, this study estimates a random-effects probit model[29], which is outlined in the following (see Baltagi 2001 and Greene 2003 for a detailed discussion of the model).

An individual's decision to remigrate in period t is modelled by a continuous latent variable, Y^*_{it}, which can be interpreted as the 'underlying propensity to remigrate'. It is given by:

[29] Another possibility would be to estimate a (random-effects) logit model. These two approaches differ by the respectively based distribution: A logit model assumes a logistic distribution, a probit model a standard normal distribution. As literature showed, the estimated coefficients should not vary considerable if the model is correctly specified.

$$Y^*_{it} = x'_{it}ß + \alpha_i + \eta_{it} \quad (3.1)$$

$$Y_{it} = 0 \text{ if } Y^*_{it} \leq 0; \quad (3.2)$$

$$= 1 \text{ if } Y^*_{it} > 0 \qquad i = 1,\ldots\ldots, n;\ t = 1,\ldots\ldots, T$$

where x'_{it} is a vector of K explanatory variables including a constant, ß the corresponding coefficient vector, α_i is a time-constant individual-specific effect, and η_{it} an error component which varies between individuals as well as over time.

It is assumed that:

$$\eta_{it} \sim \text{i.i.d. } N(0,1)$$

$$E(\alpha_i \eta_{it}) = 0 \ \forall \ i, t; \ E(\eta_{it} \eta_{jt'}) = 0 \ \forall \ i, j, t' \neq t$$

where N denotes the normal distribution function.

Within units (here individuals) the η_{it}s will be correlated. It is further assumed that the αs are independent random draws from a normal distribution:

$$\alpha_i \sim N(0,\sigma^2_\alpha)$$

Hence, the random-effects model incorporates the assumption that the independent variables (x_{it}) and the individual-specific effect (α_i) are not correlated. However, this is in most of the cases a rather implausible assumption.

An alternative would be to estimate a fixed-effects *(FE) logit*[30] model which allows for correlation between the covariates and the individual-specific effect. However, the FE model has the drawback that time-invariant variables (like in the case at hand, the variables sex, age at immigration, and country of origin) cannot be included in the regression, because the fixed-effects estimator uses only the within variance and disregards the between variance (see Baltagi 2001). Additionally, the FE is inefficient in estimating the effect of variables with a small within variance (like years of education) (see Plümper and Troeger 2007). Hence, using the FE estimator would lead to the exclusion of several important variables and – even more important in the case at hand – it would reduce the sample to the return migrants, because for all the others – for

[30] There exists no consistent estimator for a fixed effects probit model for fixed T (see Greene 2003).

the stayers – there is no change in the dependent variable. Hence, the question of interest, namely, how the return migrants differ from the group of the stayers, cannot be answered with a fixed-effects approach. Therefore, a random-effects probit model as outlined above is estimated.

The empirical approach is additional extended by estimating the so-called Mundlak model, which can be seen as a combination of the random-effects and the fixed-effects approach (see Mundlak 1978). The Mundlak approach accounts for the possible correlation between the independent variables and the unobserved component by including within-means of the independent variables, and by assuming that the unobserved component varies linearly with the group means. That means the correlation is assumed to be linear and constant over time, and hence the effect of the independent variables on the dependent variables can be estimated unbiased.
The specific features of the Mundlak model can be shown by the specification of the time-constant individual effect α_i:

$$\alpha_i = \alpha\bar{x}_i + \varepsilon_i \tag{3.3}$$

That means in the Mundlak approach α_i consists of a vector of constant parameters α multiplied with the group means of the independent variables and a normally distributed error term ε_i.
Theoretically there could be a possible correlation between self-rated health and the unobservables. Hence, in the empirical estimation the within-group means of all self-rated health dummy variables are included to account for this possible correlation.

3.5 Estimation results

3.5.1 Estimation results with regard to self-rated health

The results of the empirical analysis for the random-effects probit model are presented in table 3.3. Column two refers to the whole sample, column three only to men, and column four presents the results for women only. Overall, the results are in line with the existing literature on return migration. They show that return migrants are a self-selected group and that there exist distinct

differences between immigrants who choose to remigrate and those who choose to stay in Germany.

In this analysis, the interpretation is restricted to a simple sign interpretation: A positive sign indicates a higher probability of return migration with the respective variable, a negative sign indicates a decreasing probability.

The results with regard to the health status are for men and women adverse. For men, a reported health status of good, fair, poor or very poor lowers the probability of return migration compared to the reference category 'very good self-reported health'. With the exception of 'good self-rated health' all effects for men are significant ('fair' and 'very poor' with a p value < 0.01, 'poor' with a p value < 0.05). For women, on the contrary, all signs of the self-rated health coefficient are positive, indicating that a health status worse than 'very good' increases the probability of return migration. However, none of the coefficients is significant. Regarding the whole sample, the signs show in the same direction as for men, that is, reporting a good, fair, poor, or very poor health lowers the probability of return migration compared to the reference.
These results support the importance of a gender sensible analysis. In addition, they emphasise the importance of the analysis of return migration in the context of household interdependencies (see section 3.5.5). One reason for the differences between men and women might be that it is the head of the household – in most cases the men – who makes the return decision by taking only his own health status into account. If it is that the health status of men and women are not systematically correlated, this could be one possible explanation for the findings. But why should healthier men go back? One possible interpretation could be that, for instance, healthier men go back – after having saved enough money – to start a new business; whereas men in a poor state of health tend to stay in Germany, maybe partly because of the availability and almost free medical care treatment in Germany.
Another explanation could be related to the missing information if the individual is really going back home, or if the individual is going to a third country. If it is the wrong assumption that every individual going abroad is a return migrant, the finding that healthier men 'go back' could be explained in

the way that they do not go back, but they move on to a third country. This would also fit into the theory of a positive self-selection of migrants, thus into the first part of the "healthy immigrant effect".
With regard to the HIE return migration can indeed be a possible additional explanation for the HIE in the sense that if immigrants with a very good self-reported health status have a higher probability to return home, the average reported health status of the remaining immigrants will decrease. However, return migration seems only to be a possible explanation for men.
Overall, at least for men, the hypothesis that health plays a role in return migration cannot be rejected.

With regard to the control variables, it is found that *male immigrants* show a higher return propensity. This result has also been found by Massey and Constant (2001), whereas other studies could not detect a gender effect (see Constant and Massey 2003 or Gundel and Peters 2008). Massey and Constant (2001) explained the higher probability to return for men by different incentives for men and women (p.: 17). They stated that "women may fear that they will face stark social pressures when they return home, due to gender-role norms and patriarchal structures of the home societies. They will, thus, be reluctant to return. Similarly, men, who benefit from this system, will have a higher propensity to return" (Constant and Massey 2001: 17).
With regard to *age*, older age groups are found to have a lower probability to remigrate than those aged between 16 and 25 years. The results regarding the lower probability to remigrate for those aged 66 and above contradicts the findings in literature (for example, Constant and Massey 2003; Gundel and Peters), where a higher probability to remigrate is found. This is usually explained by life cycle considerations where retired people are supposed to have a higher probability to remigrate. The contradicting results might be explained by the fact that I explicitly control for retirement status (whereby also a higher probability to remigrate is found for the pensioners), and hence, the effect of age is net of retirement status in the analysis at hand.
The variable *country of origin* plays a significant role in explaining return migration: Immigrants from Eastern Europe – which almost all belong to the group of ethnic German resettlers – have a significantly lower probability to

remigrate. This finding has been expected, because ethnic Germans have in general no intention to return back. Also being born in Turkey decreases significantly the probability of return migration in comparison to immigrants born in EU-countries, especially for women. This might be explained by the possibility for all immigrants from EU-countries to move freely within the European Union which also comes along with lower costs of migration (see also Gundel and Peters 2008). Hence, return migration is expected to be higher among immigrants from EU-countries.

Individuals with *German citizenship* are found to have a significantly lower probability to remigrate. This is in line with the hypothesis supposing that German nationality reflects attachment to Germany.

The *location of spouse and children* is also detected to be an important determinant of return migration. Having spouse and children in the home country (respectively in Germany) can be seen as a kind of social attachment to the country of origin (respectively to Germany). Therefore, having spouse and children in the home country yields a significant higher return probability. In turn, having spouse and children in Germany lowers the probability of return migration significantly.

The coefficient of years of education is nearly equal to zero and not significant. As literature showed, the effect of education is ambiguous, depending on the initial selection (see, for example, Borjas and Bratsberg 1994). In addition, according to Pohl (2005) the effect of education depends also on the duration of residence in the host country. Therefore, it is possible that the estimated small effect is due to a "cancelling out" of contrarious effects.

Concerning *occupational status,* it is found that immigrants who are non-working, jobless, self-employed, in training, or pensioners show a significantly higher return probability than working immigrants (with the exception of men in training, where the coefficient is not found to be significant). These results are in line with literature, where it has been found that immigrants who participate in the labour force are more prone to stay in Germany (see Constant and Massey 2003).

House ownership is found to decrease the probability to remigrate significantly. This is in line with the hypothesis as house ownership signifies attachment to Germany.

Household income is a way to capture economic well-being. The effect of income can be ambiguous: On the one hand, if the initial motivation for migration was to save enough money, high income can lead to an increasing probability of return migration. On the other hand, it is possible that those immigrants return back who are "unable to 'make it' in the new country" (Constant and Massey 2002a: 22). The estimated coefficient for income is equal to zero and not significant. This can be due to the same "cancelling out" effect as with years of education. Whereas *transfers* show no significant effect, the effect of *pensions* is found to be positive and also significant for the total sample and the women sample.

Age at immigration is a key variable to capture the effect of integration into the host country. An individual who has migrated as a child usually goes to school in Germany; therefore he/she acquires social and human capital in the host country. Immigrating at an older age means that one is more attached to the home country, having a kind of "deeper roots" in the home country. An older 'age at immigration' therefore significantly increases the return probability. Some studies used *years since migration* instead of age at immigration, which captures also the effect of integration into the host country. Due to collinearity, it is not possible to use age, age at immigration, and years since migration in the same estimation equation. Therefore, an analysis using years since migration instead of age at immigration has been estimated. The results are not reported as they do not differ from the results obtained with age at immigration.

German language skills are another factor which covers attachment or integration into the German society. Hence, being fluent in German is found to decrease the probability of remigration significantly. However, these results have to be interpreted with caution due to the possible endogeneity of this variable. It is possible that e. g. learning German and the decision to return back are made simultaneously. Hence, the level of German language skills might be affected by the return intention of the immigrant, in the sense that those who wish to stay longer or permanently are more likely to learn the

language of their host country.[31] This possible endogeneity has so far not been highlighted in literature. In this study, an instrumental variable estimation to account for this endogenous relationship has not been carried out since language skills are only a control variable and since suitable instruments are lacking.

Sending *remittances* is found to increase the probability of remigration, however, the coefficients are not significant. Remittances can indicate two effects. First, immigrants can send remittances for their relatives, thus signifying ties with family and friends in the home country. Second, they can send remittances as savings for themselves to help for example to start a new business or to build a house when they return back home (see Constant and Massey 2003). Hence, sending remittances is seen as attachment to the country of origin and thus supposed to increase the probability to return.

Overall, the interpretation of the results has to be seen with caution due to the small fraction of return migrants in the sample. Another potential problem is that it is not possible to observe if migrants 'commute' between countries. For example, they may spend a part of the year in the home country to enjoy the better climate, culture environment, friends and family and so on, but still have their residence in Germany. It can be assumed that this kind of behaviour can be found rather often and more and more immigrants have such a transnational way of living, especially the older immigrants (see RKI 2008: 32). Neglecting such a possibility can influence the results. However, it is not possible to analyse such a transnational way of living with the data at hand.

To check the robustness of the results the model is reestimated using a dummy variable for health status, which takes the value one if the individual describes his/her health as 'very good' or 'good', and zero otherwise. This dummy variable is significant positive for men and not significant negative for women. The design of the variable "health status" has therefore no influence on the estimation results.

[31] Endogeneity could also arise for some of the other variables like German nationality or house ownership.

Table 3.3: Determinants of return migration: Estimation results with regard to self-rated health, random-effects probit estimation

variables	total sample		only men		only women	
self-rated health						
very good	-		-		-	
good	-0.084	(0.071)	-0.110	(0.086)	0.056	(0.136)
fair	-0.116	(0.077)	-0.266***	(0.098)	0.153	(0.140)
poor	-0.136	(0.085)	-0.259**	(0.110)	0.085	(0.151)
very poor	-0.253**	(0.115)	-0.437***	(0.157)	0.012	(0.186)
male	0.174***	(0.047)	-		-	
age						
aged 16-25	-		-		-	
aged 26-50	-0.153	(0.095)	0.018	(0.143)	-0.326**	(0.133)
aged 51-65	-0.331***	(0.115)	-0.193	(0.169)	-0.436***	(0.162)
aged 66 and above	-0.752***	(0.156)	-0.686***	(0.220)	-0.705***	(0.230)
country of origin						
other EU-countries	-		-		-	
Turkey	-0.409***	(0.096)	-0.240*	(0.136)	-0.650***	(0.142)
Greece	0.281***	(0.100)	0.342**	(0.144)	0.185	(0.144)
Italy	-0.042	(0.100)	0.036	(0.143)	-0.159	(0.146)
Spain	0.188	(0.115)	0.233	(0.164)	0.127	(0.167)
former Yugoslavia	0.134	(0.088)	0.183	(0.126)	0.070	(0.126)
Eastern Europe	-0.529***	(0.083)	-0.395***	(0.117)	-0.673***	(0.121)
other countries	-0.132	(0.116)	0.160	(0.153)	-0.647***	(0.215)
German citizenship	-0.585***	(0.090)	-0.619***	(0.124)	-0.599***	(0.137)
marital status						
widow, single, divorced	-		-		-	
spouse abroad	0.565***	(0.136)	0.547***	(0.162)	0.739**	(0.296)
spouse in Germany	-0.192***	(0.058)	-0.312***	(0.081)	-0.026	(0.091)
children						
no children	-		-		-	
children abroad	0.329***	(0.097)	0.255*	(0.130)	0.542***	(0.150)
children in Germany	-0.217***	(0.064)	-0.152*	(0.089)	-0.273***	(0.099)
years of education	0.013	(0.010)	0.007	(0.013)	0.018	(0.016)
occupational status						
working	-		-		-	
non-working	0.421***	(0.068)	0.638***	(0.123)	0.430***	(0.092)
jobless	0.341***	(0.074)	0.319***	(0.098)	0.365***	(0.120)
training	0.276**	(0.128)	0.249	(0.168)	0.364*	(0.211)
self-employed	0.339***	(0.107)	0.279**	(0.131)	0.483**	(0.196)
pensioner	0.367***	(0.087)	0.424***	(0.125)	0.375***	(0.132)
own dwelling	-0.216***	(0.067)	-0.222**	(0.093)	-0.212**	(0.100)
log of income	-0.020	(0.022)	-0.031	(0.031)	-0.008	(0.033)
log of transfers	-0.019	(0.031)	-0.050	(0.042)	0.024	(0.046)
log of pensions	0.075**	(0.029)	0.067	(0.044)	0.077*	(0.042)
log of household size	0.027	(0.099)	0.117	(0.133)	-0.067	(0.155)
age at immigration	0.013***	(0.003)	0.015***	(0.004)	0.010**	(0.004)
German fluency	-0.360***	(0.049)	-0.388***	(0.064)	-0.320***	(0.076)
remittances	0.009	(0.059)	0.014	(0.076)	0.021	(0.099)
constant	-2.072***	(0.220)	-2.129***	(0.307)	-1.996***	(0.336)
time dummy variables	yes		yes		yes	
Chi²	535.76		314.46		253.09	
Log likelihood	-1944.23		-1079.4		-836.20	
# observations	31,639		16,028		15,611	
# groups	4,426		2,255		2,171	

Standard error in parentheses; *** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP waves 1993-2005, own calculations

3.5.2 Estimation results with regard to hospital stays

Utilisation of health care services, e. g., number of doctor visits or hospital stays, is another often suggested measure of health. However, this may not be an adequate measure for health within the immigrant group if this group faces additional access barriers to health care, for example, due to a lack of language skills or due to cultural barriers. Until now, there is no clear evidence for Germany (as well as for other countries) if there is migration-related inequity in access to health care or in health care utilisation (see chapter 5). Especially, the number of doctor visits could reflect more behavioural aspects as real "need". With regard to hospital stays, it could be assumed that they are more robust to individual help care seeking behaviour and – regarding the immigrant group – also more robust to language and cultural barriers than doctor visits. Hence, another analysis is carried out using the number of nights in hospital as a proxy for health.

The questions in the SOEP with regard to hospital stays are:

> *"Where you ever admitted to a hospital for at least one night in the last year"* and
>
> *"How many nights altogether did you spend in the hospital last year?"*

A dummy variable is constructed taking the value one if an individual has spent at least one night in the hospital in the last year, and zero otherwise. Table 3.4 shows the estimation results.

For the total sample, the results are in line with the results of self-rated health: Individuals who have spent at least one night in hospital (and are thus in a poor health status by assumption) have a significant lower probability to remigrate. Additionally, also for men, the results are in line with the results from self-rated health: It is found that spending at least one night in hospital reduces the probability to remigrate for men. However, this effect is not significant. This insignificance might be due to the small percentage of men who have stayed one night in the hospital as well as due to the rather small variance. For women, the results are not in line with the results found for self-rated health: Having been admitted to hospital for at least one night yields a significant lower probability to remigrate. However, due to data restrictions, it is not

possible to control for hospital stays during childbirth. Hence, for those women being in hospital due to childbirth, hospital stays are usually not correlated with poor health. Therefore, for women, this measure of health has to be interpreted with caution.

For a discussion of the control variables see section 3.5.1. Using hospital stays instead of self-rated health does not change the estimation results for the control variables significantly.

Table 3.4: Determinants of return migration: Estimation results with regard to hospital stays, random-effects probit estimation

variables	total sample		only men		only women	
hospital stay	-0.134*	(0.075)	-0.026	(0.102)	-0.259**	(0.115)
male	0.166***	(0.050)	-		-	
age						
aged 16-25	-		-		-	
aged 26-50	-0.198*	(0.101)	-0.031	(0.159)	-0.325**	(0.136)
aged 51-65	-0.430***	(0.121)	-0.300	(0.185)	-0.502***	(0.167)
aged 66 and above	-0.820***	(0.164)	-0.764***	(0.243)	-0.744***	(0.238)
country of origin						
other EU-countries	-		-		-	
Turkey	-0.471***	(0.101)	-0.283*	(0.148)	-0.716***	(0.149)
Greece	0.269**	(0.105)	0.356**	(0.164)	0.158	(0.148)
Italy	-0.027	(0.105)	0.082	(0.153)	-0.160	(0.150)
Spain	0.133	(0.125)	0.209	(0.182)	0.041	(0.179)
former Yugoslavia	0.135	(0.092)	0.230*	(0.138)	0.042	(0.130)
Eastern Europe	-0.556***	(0.087)	-0.453***	(0.136)	-0.670***	(0.125)
other countries	-0.163	(0.120)	0.138	(0.162)	-0.666***	(0.219)
German citizenship	-0.566***	(0.093)	-0.586***	(0.138)	-0.608***	(0.139)
marital status						
widow, single, divorced	-		-		-	
spouse abroad	0.429***	(0.162)	0.370*	(0.195)	0.621*	(0.348)
spouse Germany	-0.204***	(0.062)	-0.379***	(0.094)	0.012	(0.097)
children						
no children	-		-		-	
children abroad	0.361***	(0.102)	0.291**	(0.142)	0.578***	(0.157)
children in Germany	-0.206***	(0.069)	-0.170*	(0.096)	-0.234**	(0.104)
years of education	0.016	(0.010)	0.010	(0.014)	0.020	(0.016)
occupational status						
working	-		-		-	
non-working	0.414***	(0.073)	0.540***	(0.147)	0.469***	(0.099)
jobless	0.348***	(0.079)	0.284***	(0.109)	0.437***	(0.126)
training	0.266*	(0.137)	0.224	(0.186)	0.409*	(0.216)
self-employed	0.412***	(0.110)	0.368***	(0.141)	0.530***	(0.200)
pensioner	0.346***	(0.093)	0.361**	(0.142)	0.413***	(0.141)
own dwelling	-0.198***	(0.070)	-0.163*	(0.098)	-0.240**	(0.106)
log of income	-0.017	(0.024)	-0.029	(0.034)	-0.001	(0.035)
log of transfers	-0.024	(0.033)	-0.058	(0.046)	0.027	(0.049)
log of pensions	0.074**	(0.031)	0.053	(0.047)	0.094**	(0.045)
log of household size	0.042	(0.108)	0.214	(0.147)	-0.168	(0.169)
age at immigration	0.012***	(0.003)	0.015***	(0.004)	0.009**	(0.004)
Germany fluency	-0.397***	(0.052)	-0.453***	(0.084)	-0.314***	(0.080)
remittances	0.012	(0.064)	0.036	(0.083)	-0.021	(0.108)
constant	-2.021***	(0.234)	-1.675***	(0.416)	-1.243***	(0.413)
time dummy variables	yes		yes		yes	
Chi²	469.91		112.98		230.78	
Log likelihood	-1689.71		-920.61		-746.93	
number observations	28,906		14,534		14,372	
number of individuals	4,425		2,254		2,171	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP waves 1993-2005, own calculations

3.5.3 Estimations results with regard to disability

Another analysis is conducted using 'disability' as a more objective measure of health than self-rated health. 'Disability' is measured by the question:

> *"Are you officially registered as having a reduced capacity for work or being severely disabled?"*

This question is included in the SOEP questionnaire in every wave except 1990 and 1993. The estimation results are presented in table 3.5.

Including the same covariates as in table 3.3 and table 3.4, it is found that having a disability reduces the probability of return migration. The effect is significant for the whole sample ($p < 0.01$), and for the men sample ($p < 0.05$), but it is not significant for the women sample. Hence, for men, the results are in line with the results from self-rated health and with the results from hospital stays. One can assume that the variable disability does not suffer from a potential endogeneity problem like self-rated health (see section 3.4.2). Additionally, disability might be less prone to measurement error.
Hence, the results with regard to disability support the conclusion that health plays a role in return migration for men and that – as healthier individuals seem to be more likely to return – return migration can indeed be an additional explanation for HIE, at least for men. For women, it seems to be more complicated. The results for disability and hospital stays are not in line with the results from self-rated health, even though the effect for disability is not significant.

For a discussion of the control variables see section 3.5.1. Using disability instead of self-rated health does not change the estimation results for the control variables significantly.

Table 3.5: Determinants of return migration: Estimation results with regard to disability, random-effects probit estimation

variables	total sample		only men		only women	
disability	-0.195**	(0.077)	-0.243**	(0.103)	-0.157	(0.123)
male	0.197***	(0.051)				
age						
aged 16-25	-		-		-	
aged 26-50	-0.173*	(0.095)	-0.021	(0.148)	-0.299**	(0.130)
aged 51-65	-0.363***	(0.114)	-0.277	(0.175)	-0.389**	(0.157)
aged 66 and above	-0.804***	(0.157)	-0.806***	(0.231)	-0.665***	(0.226)
country of origin						
other EU-countries:	-		-		-	
Turkey	-0.420***	(0.099)	-0.245*	(0.144)	-0.663***	(0.142)
Greece	0.287***	(0.107)	0.378**	(0.163)	0.183	(0.143)
Italy	-0.044	(0.102)	0.037	(0.152)	-0.149	(0.146)
Spain	0.187	(0.119)	0.263	(0.178)	0.108	(0.167)
former Yugoslavia	0.134	(0.090)	0.202	(0.136)	0.066	(0.126)
Eastern Europe	-0.542***	(0.091)	-0.426***	(0.132)	-0.674***	(0.121)
other countries	-0.131	(0.118)	0.175	(0.162)	-0.661***	(0.215)
German citizenship	-0.592***	(0.095)	-0.653***	(0.138)	-0.598***	(0.136)
marital status						
widow, single, divorced	-		-		-	
spouse abroad	0.556***	(0.142)	0.524***	(0.178)	0.756**	(0.297)
spouse in Germany	-0.195***	(0.060)	-0.343***	(0.090)	-0.011	(0.091)
children						
no children	-		-		-	
children abroad	0.327***	(0.100)	0.258*	(0.139)	0.553***	(0.149)
children Germany	-0.222***	(0.066)	-0.155*	(0.093)	-0.280***	(0.099)
years of education	0.015	(0.010)	0.012	(0.014)	0.017	(0.015)
occupational status						
working	-		-		-	
non-working	0.430***	(0.074)	0.658***	(0.142)	0.434***	(0.092)
jobless	0.348***	(0.076)	0.329***	(0.105)	0.379***	(0.120)
training	0.284**	(0.130)	0.274	(0.175)	0.363*	(0.211)
self-employed	0.342***	(0.111)	0.296**	(0.139)	0.480**	(0.195)
pensioner	0.390***	(0.092)	0.448***	(0.140)	0.398***	(0.133)
own dwelling	-0.215***	(0.068)	-0.225**	(0.100)	-0.210**	(0.099)
log of income	-0.017	(0.023)	-0.026	(0.032)	-0.006	(0.034)
log of transfers	-0.017	(0.031)	-0.048	(0.044)	0.026	(0.046)
log of pensions	0.083***	(0.031)	0.082*	(0.047)	0.079*	(0.042)
log of household size	0.020	(0.102)	0.095	(0.143)	-0.076	(0.155)
age at immigration	0.012***	(0.003)	0.015***	(0.004)	0.009**	(0.004)
Germany fluency	-0.362***	(0.054)	-0.402***	(0.077)	-0.319***	(0.076)
remittances	0.009	(0.060)	0.004	(0.079)	0.028	(0.099)
constant	-2.035***	(0.223)	-2.308***	(0.337)	-1.792***	(0.321)
time dummy variables	yes		yes		yes	
Chi²	245.94		126.85		252.41	
Log likelihood	-1943.41		-1082.52		-836.60	
number of observations	31,639		16,028		15,611	
number of individuals	4,426		2,225		2,171	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP waves 1993-2005, own calculations

3.5.4 Estimation results for the Mundlak approach

As outlined in section 3.4.7, the so far estimated random-effects model incorporates the assumption that the independent variables and the individual-specific effect are not correlated. However, this assumption does usually not hold. Hence, in this section, the so-called Mundlak approach is estimated, which accounts for the possible correlation between the independent variables and the unobserved component by including within-means of the independent variables (see section 3.4.7 for a discussion).

Table 3.6 shows the estimation results for the Mundlak approach. Again, the estimation is carried out for the total sample, and separately for men and women.

The coefficients of the means of self-rated health are highly significant for all three subsamples. Hence, under the assumption of the Mundlak approach, these results can be interpreted as the existence of correlation between self-rated health and the individual-specific effect in the random-effects probit model.

In the Mundlak specification, the effect of self-rated health on return migration is positive and significant, for the whole sample, as well as for men and women. At first glance, this contradicts the findings of the random-effects probit model, where for men a significant negative effect has been found. However, the coefficients of the means of self-rated health are highly significant and negative. According to Ferrer-I-Carbonell and van Praag (2003) the coefficients in the Mundlak approach can be decomposed into a permanent and a transitory effect in the following way:

$$Y_{it} = \beta x_{it} + \gamma \overline{x_i} = \beta(x_{it} - \overline{x_i}) + (\beta + \gamma)\,\overline{x_i} \qquad (3.4)$$

whereby β can be interpreted as the transitory effect and $\beta + \gamma$ as the permanent effect. Hence, in the case at hand, the permanent effect suggests that immigrants who rate their health worse than ‘very good’ have a significantly lower probability to remigrate. The transitory effects shows that a

health shock yield to a higher probability to remigrate. The results of the transitory effects are comparable to the results of a fixed-effects model, which can only be estimated for the group of the return migrants. Therefore, the results can be interpreted in a way that overall, healthier immigrants have a higher probability to return home. However, within the group of return migrants, a deterioration of health increases the probability of return migration.

Table 3.6: Determinants of return migration: Estimation results for the Mundlak approach

variables	total sample		only men		only women	
self-rated health						
very good	-		-			
good	0.195**	(0.095)	0.185	(0.117)	0.265	(0.173)
fair	0.333***	(0.109)	0.246*	(0.140)	0.495***	(0.190)
poor	0.419***	(0.123)	0.379**	(0.161)	0.535***	(0.206)
very poor	0.399**	(0.169)	0.360	(0.240)	0.538**	(0.258)
mean self-rated health						
very good	-		-		-	
good	-0.561***	(0.138)	-0.557***	(0.169)	-0.453*	(0.254)
fair	-0.841***	(0.150)	-0.946***	(0.193)	-0.654**	(0.259)
poor	-1.005***	(0.172)	-1.115***	(0.228)	-0.861***	(0.286)
very poor	-1.108***	(0.235)	-1.294***	(0.327)	-0.946***	(0.366)
male	0.145***	(0.048)				
age 16-25	-		-		-	
age 26-50	-0.098	(0.096)	0.080	(0.145)	-0.275**	(0.134)
age 51-65	-0.230**	(0.117)	-0.070	(0.173)	-0.354**	(0.165)
age 66 and above	-0.668***	(0.157)	-0.589***	(0.223)	-0.633***	(0.233)
other EU-countries	-		-		-	
Turkey	-0.430***	(0.097)	-0.268*	(0.138)	-0.663***	(0.144)
Greece	0.267***	(0.101)	0.318**	(0.146)	0.180	(0.144)
Italy	-0.034	(0.101)	0.039	(0.145)	-0.150	(0.147)
Spain	0.156	(0.117)	0.185	(0.166)	0.117	(0.168)
former Yugoslavia	0.124	(0.088)	0.168	(0.127)	0.068	(0.127)
Eastern Europe	-0.525***	(0.084)	-0.394***	(0.119)	-0.673***	(0.123)
other countries	-0.154	(0.116)	0.151	(0.154)	-0.674***	(0.215)
German citizenship	-0.586***	(0.091)	-0.614***	(0.126)	-0.604***	(0.137)
spouse abroad	0.599***	(0.138)	0.593***	(0.164)	0.749**	(0.301)
spouse Germany	-0.168***	(0.059)	-0.285***	(0.083)	-0.013	(0.092)
children abroad	0.351***	(0.097)	0.268**	(0.131)	0.568***	(0.150)
children Germany	-0.213***	(0.065)	-0.139	(0.090)	-0.278***	(0.099)
years of education	0.010	(0.010)	0.002	(0.013)	0.015	(0.016)
working	-		-		-	
non-working	0.422***	(0.068)	0.649***	(0.124)	0.433***	(0.093)
jobless	0.341***	(0.075)	0.313***	(0.099)	0.375***	(0.120)
training	0.255**	(0.130)	0.206	(0.170)	0.373*	(0.213)
self-employed	0.316***	(0.108)	0.241*	(0.133)	0.488**	(0.196)
pensioner	0.409***	(0.088)	0.475***	(0.127)	0.408***	(0.134)
own dwelling	-0.219***	(0.067)	-0.215**	(0.094)	-0.221**	(0.100)
log of income	-0.023	(0.022)	-0.036	(0.031)	-0.010	(0.034)
log of transfers	-0.013	(0.031)	-0.046	(0.043)	0.033	(0.046)
log of pensions	0.080***	(0.030)	0.078*	(0.044)	0.077*	(0.042)
log of household size	0.011	(0.100)	0.105	(0.135)	-0.090	(0.156)
age at immigration	0.014***	(0.003)	0.016***	(0.004)	0.010***	(0.004)
Germany fluency	-0.368***	(0.049)	-0.391***	(0.065)	-0.331***	(0.077)
remittances	0.013	(0.060)	0.019	(0.077)	0.029	(0.100)
constant	-1.753***	(0.228)	-1.622***	(0.316)	-1.624***	(0.359)
time dummy variables	yes		yes		yes	
Chi²	565.96		342.35		258.46	
Log likelihood	-1922.06		-1061.99		-830.36	
# observations	31,639		16,028		15,611	
# groups	4,426		2,255		2,171	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP waves 1993-2005, own calculations

3.5.5 Approach to family interdependencies

Throughout this chapter, return migration has been modelled so far as an individual decision choice. However, it can be assumed that family / household interdependencies play an important role in the return decision. The role of family and households has been highlighted by the 'new economics of migration' (see Haug and Sauer 2006 for an overview; Stark and Bloom 1985). According to this theory, the household is in the centre of attention and migration is seen as result of a household decision. Hence, it can also be assumed that the return decision of persons who belong to the same household are not made on an individual basis, but depend on the corresponding partner / household members.

A first look on the date can help to gain a first impression of the importance of household relations in return migration: 119 return migrants (out of 435) are accompanied by another household member, eight return migrants are accompanied by two other household members, and a few return migrants are accompanied by even more household members. That means that around 70% of all return migrants are accompanied by at least one family member when returning back (excluding children under the age of 16).[32]

Although the importance of the family or household context has been recognised in literature, an approach to model such interdependencies in empirical studies is lacking so far. In this study, a first approach to investigate such interdependencies related to health is done by conducting estimations for married women and men, respectively, and including the health status of their corresponding partner as an independent variable. Hence, a dummy variable is constructed indicating if the partner has rated his or her health as very good or good. The estimation results are presented in table 3.7.

The results indicate that a good health status of a woman's husband increases the return probability of the woman; however, the result is not significant. In contrast, a good health status of a man's spouse lowers his return probability,

[32] As individuals born in Germany are excluded, household interdependencies are underestimated if household members going abroad are born in Germany.

but again, the effect is not significant. The coefficient of good self-rated health remains positive and significant for men, and thus, even when it is controlled for the health status of the partner, men's own health seem to be an important factor influencing return migration.

These first results show the complexity and importance of the relationship between health, return migration, and family interdependencies. Future studies on return migration are needed to shed more light on these complex interactions.

Table 3.7: Approach to family interdependencies: Estimation results

	random-effects probit model			
variables	**only married women**		**only married men**	
srh good	-0.116	(0.095)	0.223***	(0.085)
srh partner good	0.123	(0.089)	-0.136	(0.086)
age				
aged 16-25	-		-	
aged 26-50	-0.214	(0.203)	-0.378	(0.255)
aged 51-65	-0.171	(0.229)	-0.582**	(0.271)
aged 66 and above	-0.364	(0.297)	-0.992***	(0.318)
country of origin				
other EU-countries	-		-	
Turkey	-0.948***	(0.187)	-0.410**	(0.191)
Greece	0.008	(0.186)	0.298	(0.194)
Italy	-0.313*	(0.189)	-0.024	(0.201)
Spain	0.024	(0.207)	0.364*	(0.219)
former Yugoslavia	-0.077	(0.167)	0.245	(0.177)
Eastern Europe	-0.769***	(0.161)	-0.600***	(0.155)
other countries	-0.709**	(0.276)	-0.111	(0.255)
German citizenship	-0.791***	(0.204)	-0.394**	(0.177)
children				
no children	-		-	
children abroad	0.802***	(0.173)	0.327*	(0.179)
children in Germany	0.065	(0.136)	-0.037	(0.125)
years of education	0.002	(0.020)	0.015	(0.018)
occupational status				
working	-		-	
non-working	0.529***	(0.116)	0.660***	(0.156)
jobless	0.597***	(0.144)	0.305**	(0.132)
self-employed	0.230	(0.305)	0.254	(0.189)
pensioner	0.488***	(0.157)	0.466***	(0.161)
own dwelling	-0.331**	(0.129)	-0.503***	(0.140)
log of household income	-0.021	(0.040)	-0.034	(0.039)
log of transfers	0.070	(0.053)	0.000	(0.055)
log of pensions	0.113**	(0.051)	0.075	(0.062)
log of household size	-0.488**	(0.226)	-0.158	(0.208)
age at immigration	0.010*	(0.005)	0.014***	(0.005)
German fluency	-0.267***	(0.095)	-0.342***	(0.084)
remittances	0.095	(0.120)	0.042	(0.093)
constant	-1.500***	(0.442)	-1.877***	(0.454)
time dummy variables	yes		yes	
Chi²	188.58		174.91	
Log likelihood	-549.85		-613.01	
number of observations	10,902		11,395	
number of groups	1,579		1,608	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Note: Training is excluded because it predicts failure perfectly
Source: SOEP waves 1993-2005, own calculations

3.6 Conclusion and discussion

This chapter investigates return migration as an additional explanation for the deterioration in immigrants' health. The idea behind this possible explanation is that the decline in immigrants' health can additionally be caused by a kind of "statistical artefact" in the way that if healthier immigrants are more likely to remigrate, the average health of the remaining immigrants will decrease. Measures of the "healthy immigrant effect" (HIE) may therefore be biased if a significant fraction of immigrants remigrate back to their home country (or migrate to a third country) and if these immigrants are non-randomly selected by health.

Using thirteen waves of the SOEP to analyse the factors that determine return migration, the study shows – in congruence with the existing literature – that having spouse and children living in the home country as well as being non-working or jobless yield a significant higher return probability, whereas all factors associated with attachment to Germany (like German citizenship, house ownership or age at immigration) reduce the probability of return migration.

With regard to health, the results indicate that men reporting poorer subjective health or men who are disabled are significantly less likely to return home relative to immigrants who describe their health as 'very good' or who are not disabled. For women, the effects of self-rated are adverse to that of men, and none of the health coefficients for women is found to be significant. In contrast, disabled women are found to have a lower probability to return back; but again, the coefficient is not significant.

A first approach to take household interdependencies into account shows that a good health status of a woman's husband increases the return probability of the woman; however, the result is not significant. In contrast, for men whose spouse rates her health as very good or good, the return probability is lower, but again the coefficient is not significant. However, the coefficient of good self-rated health remains positive and significant for men, and thus, even when it is controlled for the health status of the partner, men's own health seem to be an important factor influencing return migration.

Overall, the hypothesis that health plays a role for return migration cannot be rejected – at least for men. Additionally, return migration might contribute to explain the second part of the HIE (hence, the deterioration of immigrants' health over time) as healthier immigrants are found to have a higher probability to remigrate. Again, this holds only for men as for women no clear results have been found.

It should also be taken in mind that return migration is only one aspect of panel attrition. It can also occur due to refused participation, unsuccessful tracking, or death. If panel attrition follows a selectivity pattern regarding health, it can influence studies on the HIE. Especially, it is very probable that the individuals who have died during the period are negatively selected by health, which could lead to an opposite effect. However, only 0.4 percent of the sample has died. But nevertheless, one should in addition estimate a multinomial model, allowing for all possibilities of panel attrition, or at least a joint model of dying and return migration.

As the staying of immigrants in a poor health status might partly be explained by the quality and availability of health care services, future studies should additionally account for the quality of the health care system of the country of origin as this might influence the return decision.

A new feature of the SOEP is called "Living outside Germany", which was conducted for the first time in 2007. Thereby, a new questionnaire has been designed especially for individuals who have left Germany to gather information on their "life outside Germany". This could provide new insights on return migration, as some of the outmigrants might be return migrants.

Finally, in addition to quantitative studies, more qualitative studies are needed to shed light on the wide range of factors determining remigration as well as on the complex structures and interactions behind these decisions.

4 The health behaviour of immigrants

4.1 Introduction

This chapter concentrates on the possible contribution of an adaptation of destination-country habits and lifestyles to the decline in immigrants' health. The idea is that if health behaviour – considered harmful to health (e. g., smoking, alcohol consumption, poor dietary habits, or physically inactivity) – converges to the level of natives, this might contribute to the deterioration of immigrants' health with years since migration (ysm). Hence, this chapter aims at providing an overview on the health behaviour of immigrants in Germany and especially, it analyses the changes in health behaviour of immigrants with their duration of residence.

Health behaviour includes sports activities, smoking, alcohol consumption, dietary habits, preventive medical examination, and risky sexual behaviour. Additionally, the Body Mass Index (BMI) is another common measure for immigrants' adaptation to the host countries lifestyle (see, among others, Antecol and Bedard 2006 or Cairney and Øsbye 1999), because it is assumed that the BMI is to a large part determined by dietary habits and physical activities.

Unfortunately, some of the questions (e. g. alcohol consumption) have only been asked in one wave of the SOEP. Hence, it is not possible to exploit the panel data structure of the SOEP for each indicator. Additionally, preventive health care seeking has to be ignored, because it is not possible in the SOEP to distinguish between preventive and curative utilisation of health care. Also there is no information in the SOEP on risky sexual behaviour.

The outline of this chapter is as follows. Section 4.2 provides an overview on the theories of health behaviour. Section 4.3 summarises previous empirical findings with regard to the health behaviour of immigrants. The description of the data and the empirical methodology can be found in section 4.4. Section 4.5 discusses the empirical findings and chapter 4.6 concludes.

4.2 Theories of health behaviour

According to Koos (1954) all behavioural aspects – either constitutional or harmful – which are correlated with health or disease, are called "health behaviour" (see Koos 1954). The behavioural aspects that are constitutional for health are called "positive health behaviour", and those harmful or risky to health are called "negative health behaviour".

In literature, there is a large variety of theoretical models and concepts, which all seek to explain the factors influencing an individual's health behaviour. Broadly speaking, one can distinguish between two kinds of models of health behaviour: Psychological approaches and sociological approaches.

The psychological approaches assume in general that health behaviour depends on the individual's attitudes, preferences, beliefs, and knowledge (an overview and a discussion of the psychological concepts can be found in Schwarzer 1996). These individual approaches have been largely criticised, especially for neglecting material, social, and cultural influences on health behaviour (see, for example, Abel 1992; Ferber 1979; Steinkamp 1993).

In the sociological approaches it is assumed that the health behaviour depends on social life circumstances and social norms. Individual behaviour is therefore imbedded in social structures, and also influenced by those structures. For an overview on the different sociological approaches, see, among others, Seidenstücker (2002).

As there is huge evidence for socio-economic differences in health behaviour (for Germany, see, for example, Elkeles and Mielck 1997: 141), this study follows the sociological approach, and thus the health behaviour is seen as a complex subject, depending on a broad array of individual, material, social, and cultural influence factors.

For immigrants, it is suggested that they change their health behaviour with increasing duration of residence in the host country due to a process of acculturation. Hence, they are supposed to adopt the "host country's way of living". This adaptation of health behaviour has been shown in many countries and for different immigrant groups (see section 4.3 for a discussion of the respective literature). However, as McDonald and Kennedy (2005) noted, the extent of adaptation depends "on the concentration and behaviour of people in

the same geographic area who are of similar ethnic background, culture and language to the immigrant" (p.: 2470). One explanation for that might be the availability of traditional food. Assuming, for example, that the change in dietary habits depends on the higher availability and the lower price of certain food (e. g., fast food) in the host country compared to the immigrants' home country. Then – as Chiswick and Miller (2002) suggested – it might be easier for the immigrants to retain traditional dietary habits in areas with a higher concentration of particular ethnic groups, because in these areas the market for traditional goods is large enough to allow the supply of these goods at reasonable prices.

Hence, regarding immigrants' behaviour patterns, it is assumed that the higher the concentration of immigrants in a region, the less likely are immigrants to adopt their health behaviour.

4.3 Previous empirical findings

The health behaviour of immigrants, or rather the convergence of immigrants' health behaviour to native levels, has been studied extensively for the United States and Canada, while there is only little empirical evidence for the European countries, especially for Germany.

One of the first and most influential studies was that of Marmot and Syme (1976). They investigated the prevalence of chronic heart disease among male immigrants from Japan to Hawaii and California. Their results showed that those immigrants who retained more of their traditional cultural practices had a lower prevalence of chronic heart disease than those immigrants who retained less. In a more recent study for the United States, Singh and Siahpush (2002) analysed pooled data from the National Health Interview Survey (NHIS) and found that immigrants' incidence of smoking, obesity, hypertension, and chronic conditions are significantly lower than for comparable native-born people, but increase with duration of residence in the United States. Their results concerning obesity were confirmed by Goel et al. (2004), who found an increase in the prevalence of obesity among immigrants residing in the United States for ten years or more using the same data set as Singh and Siahpush

(2002). Also Antecol and Bedard (2006) examined pooled data from the NHIS for the years 1989-1996 and found that female immigrants almost completely converge to the BMIs of natives within their first decade of residence in the United States. For male immigrants, however, Antecol and Bedard (2006) showed that they close only one third of the initial BMI gap after fifteen years since arrival. Gordon-Larsen et al. (2003) used data from the National Longitudinal Study of Adolescent Health to investigate possible explanations for overweight (e. g., dietary habits and physical activity) among first- and second-generation U.S. immigrants (Mexicans, Puerto Ricans, and Cubans). Their results showed a rapid acculturation with regard to obesity-related behaviours with first and subsequent generation of U.S. immigrants, and – with the exception of Mexican-Americans – markedly higher rates of overweight in the group of second-generation immigrants. Using the 2003 cohort of another data set, namely the U.S. New Immigrant Survey (NIS), Akresh (2007) analysed also dietary habits of immigrants in the years after arrival in the United States. She found that immigrants' dietary habits change with years since migration yielding mostly in a higher consumption level of meat and junk food. Additionally, she showed that strong dietary changes are closely related to an increasing BMI. The National Latino and Asian American Survey (2002-2003) was used in a recent study by Bates et al. (2008) to analyse the evolution of the BMI among the first, second, and third generation Latinos and Asian Americans. Among most of the subgroups, they found an increase of the BMI in later generations, but the degree of changes in the BMI varied among Latinos and Asian Americans suggesting different patterns of adaptation.

For Canada, Cairney and Øsbye (1999) used data from the 1994/95 wave of the National Population Health Survey (NPHS) to examine the relationship between time since migration and excess weight. They concluded that the duration of residence is an important correlate of overweight and obese for immigrant women, and for men of Asian origin. However, the studies of Pérez (2002) and Ng et al. (2005) found only mixed evidence of convergence in the health behaviour of immigrants regarding smoking, inactivity, excess weight, and dietary habits. Pérez (2002) used data from Statistics Canada's cross-

sectional 2000/01 Canadian Community Health Survey (CCHS). He found that the immigrants' health-related lifestyle behaviour varies with duration of residence in Canada. However, Pérez (2002) concluded that his results do not show that immigrants become more like native Canadians with respect to health behaviour with increasing years since migration. Additionally, he showed that health behaviour cannot generally explain the differences in health between immigrants and native-borns. Though, Pérez noted, "a longitudinal analysis in which immigrant respondents are followed over a period of time is needed to shed further light on these patterns" (p.: 10). Ng et al. (2005) used five cycles of longitudinal data of the NPHS (1994/95-2002/03) to investigate the risk of becoming a daily smoker, inactive in leisure time, and to have a substantial weight gain for those European and non-European immigrants who have rated their health as either excellent, very good, or good in 1994/95. They found that while over time only very few non-European immigrants became daily smokers, they were a bit more likely than Canadians to become physically inactive, but the difference was not statistically significant. Hence, Ng et al. (2005) concluded that the initiation of smoking or becoming physically inactive is unlikely to contribute to the deterioration of health (p.: 4-5). In contrast, weight gain is found to be a possible contributor: Non-European immigrants are found to be twice as likely as Canadian borns to experience an increase in their BMI of 10% (p.: 5). This result supports that of Cairney and Øsbye (1999) concerning immigrants increasing BMI. Additionally, these results regarding immigrants "weight gain" with years since migration are sustained by the analysis of McDonald and Kennedy (2005). Combining different data sets (NPHS, wave 1996; CCHS, wave 2000-2001, and two Canadian Census files), they found that, on average, recent immigrants are less likely to be obese or overweight, but that these measures converge to native-born levels with years since migration. However, they found huge differences in the convergence pattern by the ethnicity of the immigrants, which they explained by different degrees of interaction with members of the same ethnic group residing in the same regional area. Hence, the existence of social network effects tempers the process of adjustment to Canadian lifestyle norms, and thus the incidence of becoming overweight or obese (see McDonald and Kennedy 2005). McDonald (2006) analysed the

incidence of a range of health behaviours for immigrants compared to native-born white Canadians using also data from the NPHS and CCHS. He found that immigrants generally exhibit significantly lower rates of alcohol consumption, binge drinking, and daily smoking, but that they also showed lower participation in physical activities and lower consumption of fruits and vegetables. He also found that for most immigrant men, alcohol consumption and smoking increase with years in Canada, whereas he did not find any significant change with years since migration in health behaviours for immigrant women.

For Germany, there are only very few studies analysing the health behaviour of migrants, and – as far as I know – there is only one study, which reveals some evidence on the evolution of the immigrants‘ health behaviour with duration of residence in Germany.

With regard to smoking behaviour, data from the German microcensus of 2003 and 2005 showed that foreign men are to a larger proportion smokers than German men: In the group aged between 20 and 60 years, 48.8% of foreign men reported to smoke compared to 39.7% of German men. For women, the differences in the smoking behaviour are smaller than for men, with a slightly higher smoking prevalence for German women (see Lampert et al. 2005: 131; RKI 2008: 55f.). In 1998, a study collected data in different vocational schools in Munich about the health behaviour of adolescents (between 15 and 24 years) (see Dill et al. 2002). Regarding smoking behaviour, nearly 60% of the students reported to smoke, whereby the percentage was slightly smaller in the group of students with a migration background (54% compared to 60% among women and 50% compared to 62% among men). However, the second-generation of immigrants was found to have the highest prevalence of smoking (see Dill et al. 2002).

With regard to alcohol consumption, the study of Dill et al. (2002) revealed that only 19.5% of all juvenile Germans report to never consume any alcohol in comparison to 50.1% in the group of adolescents with a migration background. With a higher duration of residence in Germany, alcohol consumption was found to increase, and the second-generation of immigrants reported to consume more alcohol than first-generation vocational school

students (see Dill et al. 2002). Hence, there is evidence for an acculturation process of the second-generation.

With regard to the utilisation of preventive health care, the German microcensus of 2003 contained information on influenza vaccination. Whereas for all aged 50 and older, around 32.2% of the Germans got vaccinated, the percentage in the group of the foreigners amounted only to 18.6%. However, in the group of children, more foreign children got vaccinated against influenza than German children (see Lampert et al. 2005).

Regarding sports activities, Abel (1984) evaluated questionnaires from 838 individuals above the age of 10. He found that male immigrants have more interest in sports than female immigrants, younger immigrants are more interested than older immigrants, and German language skills have a positive influence on sports activities. A drawback of the study is, however, that most of the respondents were under the age of 26, and most of them were men, which hints to an age and gender bias.

4.4 Data and estimation method

4.4.1 Data

The data from this chapter are drawn from different waves of the SOEP (see section 1.4 for a detailed description of the SOEP). Additionally, as the SOEP contains information about the region the household is living in, macro-indicators provided by the 'Federal Office for Building and Regional Planning' (*Bundesamt für Bauwesen und Raumordnung*, BBR) can be merged to the SOEP data. There are different regional levels available, namely federal states, regional policy regions, and the county or district level (see BBR 2004). In this chapter, the share of foreigners on the county level is merged to the SOEP data.[33] Overall, there are 439 counties in Germany (see Jürges 2007: 14). With regard to the share of foreigners, there are large differences between the counties. In 2005, the highest share of foreigners can be found in Offenbach (26.2%), Munich (24%), Stuttgart (23.7%), and Mannheim (22.0%), the lowest

[33] According to data protection rules, this part of the research using regional information was carried out at the DIW Berlin. I thank the staff for making the information available.

share of foreigners can be found in Sömmerda (Thuringia, 0.7%), Saalkreis (0.9%), and Annaberg (1.0%). In general, the share of foreigners is rather high in West German urban areas and rather low in the east of Germany. A regional overview on the distribution of foreigners in Germany can be found in figure A1 in the appendix.

4.4.2 Empirical strategy

As panel data are available, it is possible to control for time-constant individual-specific unobserved heterogeneity like genetic disposition or environmental exposition in the country of origin. For continuous dependent variables the two most used panel estimators are the random-effects estimator and the fixed-effects estimator, which are outlined in this section (see, for example, Baltagi 2001; Wooldridge 2002).

Consider the following model:

$$y_{it} = x'_{it}ß + e_{it} \qquad i = 1,....,n \text{ and } t = 1,….T \qquad (4.1)$$

whereby y_{it} is the value of the dependent variable for individual i at time t, x'_{it} is a vector of K explanatory variables including a constant, ß is the corresponding coefficient vector, and e_{it} is the error term. This error term e_{it} is supposed to consist of a time-constant individual-specific effect α_i and a common stochastic error term η_{it}:

$$e_{it} = \alpha_i + \eta_{it} \qquad (4.2)$$

whereby it is assumed that η_{it} is uncorrelated with the x_{it} and varies unsystematically across individuals and time:

$$E(\eta_{it}) = 0 \qquad (4.3)$$

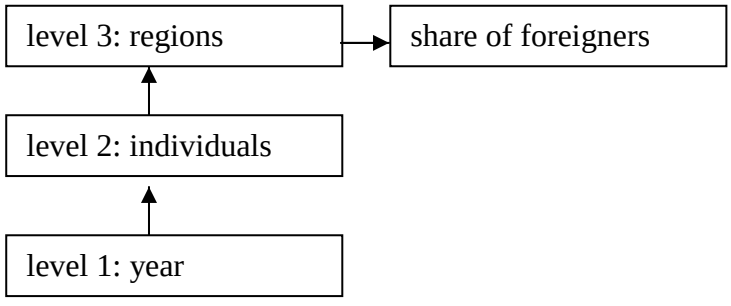
$$E(\eta_{it}\eta_{is}) = 0 \text{ for all } t \neq s \qquad (4.4)$$

The crucial distinction between the random-effects model and the fixed-effects model lies in the assumptions about the time-constant individual-specific effect α_i: Whereas in the random-effects model it is assumed that α_i is uncorrelated with x_{it}, in the fixed-effects model it is assumed that α_i is correlated with x_{it}.

In general, the assumption that the independent variables are uncorrelated with the individual-specific effect does not hold, which is an argument in favour of the fixed-effects model. However, as the fixed-effects model uses only the variation within an individual's set of observations, it is not possible to include time-invariant explanatory variables (like in the case at hand 'country of origin' and 'religious affiliation'[34]) in the estimation model (see Baltagi 2001; Wooldridge 2002). Another shortcoming of the fixed-effects estimator lies in its inefficiency in the estimation of the effects of variables with small within variance (see Plümper and Troeger 2007). This is an important issue for the data at hand, because only data from three waves are available, and therefore, the within variance is for most of the independent variables rather little.

Additionally, it should also be taken into account that the data at hand have a three-level structure, as information on the regional level (the share of foreigners on the county level) is included. Hence, not only longitudinal observations are nested within individuals, but also individuals are nested within regions (see figure 4.1). Ignoring the existence of such a hierarchical structure will generally underestimate the standard errors of the regression coefficient, and thus mislead inference (see Moulton 1990).

Figure 4.1: Hierarchical structure of the data



Source: Own compilation

To account for the multilevel structure of the data the error term is extended by a regional-specific effect as follows:

[34] Religious affiliation is time-constant in the case at hand as the question was only included once during the analysed timeframe. However, it can be assumed that individuals usually do not change their religious affiliation. Hence, the assumption of time-constant religious affiliation might be tenable in reality.

$$e_{itk} = \alpha_{ik} + v_k + \varepsilon_{itk} \quad (4.5)$$

whereby α_{ik} denotes the individual-specific effect and v_k captures the regional-specific effect. Both are assumed to be constant over time. ε_{itk} is the idiosyncratic error term. Furthermore, it is assumed that

$$v_k \sim N(0, \sigma^2_v),$$
$$\alpha_{ik} \sim N(0, \sigma^2_\alpha), \text{ and}$$
$$\varepsilon_{itk} \sim N(0, \sigma^2_\varepsilon).$$

Hence, a multilevel model is estimated to take the hierarchical structure of the data into account. For the sake of comparison, the estimation results for the random-effects model and the fixed-effects model are also reported.

4.4.3 Dependent variables

Dietary Habits

Unfortunately, there is not very much information in the SOEP with regard to dietary habits. The only exception is the following question, which has been included in the questionnaire in 2004 and 2006:

To what extent do you follow a health-conscious diet?

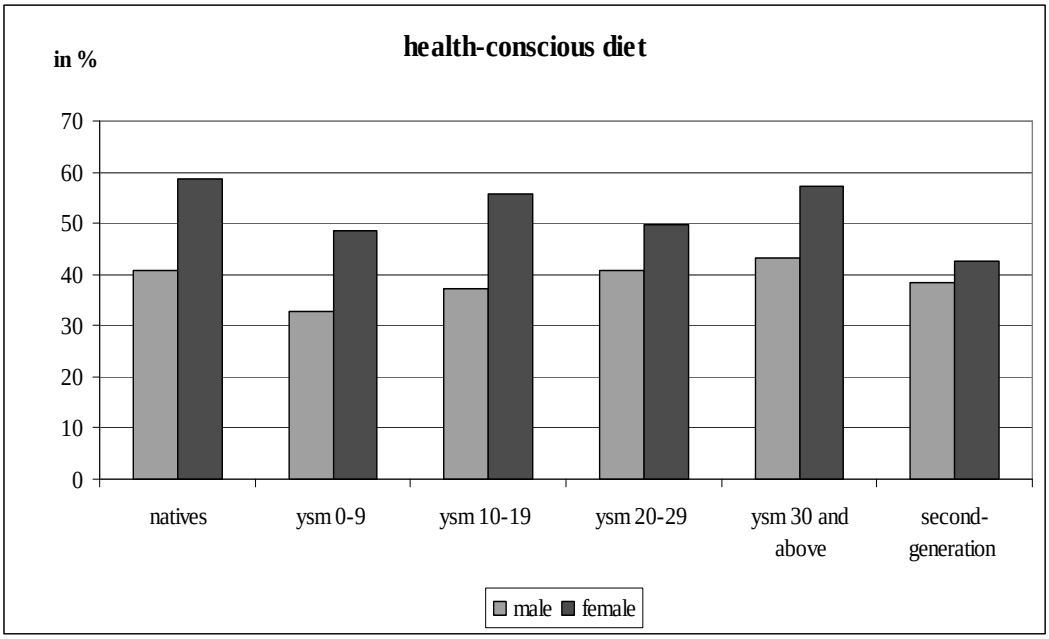
with four different possibilities to answer: Very much, much, not so much, or not at all.

Figure 4.2 displays a first descriptive approach to the evolution of a health-conscious diet with immigrants' duration of residence and compared to individuals born in Germany. Thereby it is distinguished between individuals born in Germany with German nationality (referred to as 'natives' in the following) and individuals born in Germany having no German nationality (referred to as 'second-generation' in the following). Using such a cursory approach, it should be taken in mind, that in the group of 'natives' also naturalised second-generation immigrants are included.

A dummy variable is constructed for 'healthy diet', taking the value one if the answer is very much or much, and zero otherwise. Figure 4.2 shows the distribution of a health-conscious diet by gender and years since migration in the wave 2004 of the SOEP.

For all groups, women report more often than men to follow a health-conscious diet. For men, there is a slight increase in the reporting of following a health-conscious diet with years since migration, but for women, no consistent pattern occurs. Overall, this figure points more in the direction of a healthier diet with years since migration. Hence, this first descriptive approach does not give any hints that a change in immigrants' diet might contribute to the healthy immigrant effect. However, it should be taken in mind that the question is very unspecific and we have no information on what is understood by a "health-conscious diet", or what the individuals are really eating. Therefore, the question might be prone to measurement error and what is understood by "health-conscious diet" can be influenced by cultural issues, or it can even change with the duration of residence because of the changing environment. Hence, one should be cautious with the question at hand and with the interpretation of the results.

Figure 4.2: Health-conscious diet according to gender and years since migration



Source: SOEP, wave 2004, weighted

Sports activities

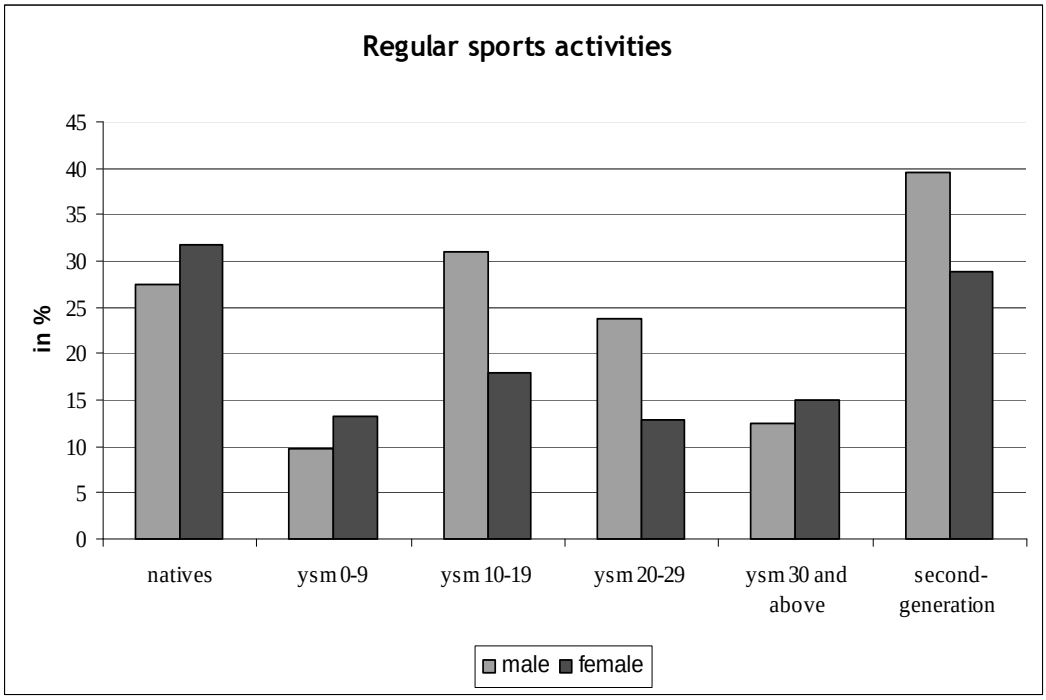
The question concerning sports activities has only been asked in 2004:

How often do you take part in sport, gymnastics or fitness training?

with three possibilities: regularly, occasionally, or never.

Overall, the proportion of immigrants reporting to take regularly part in sports activities is lower than for natives, regardless of their duration of residence with the exception of male immigrants who are in Germany for 10-19 years. But again, the graph shows no clear pattern regarding sports activities with years since migration.

Figure 4.3: Regular sports activities by gender and years since migration



Source: SOEP, wave 2004, weighted

Body Mass Index (BMI)

It can be assumed that the BMI is for most individuals to a large part determined by dietary habits and sports activities. As the questions with regard to dietary habits and sports activities are not very detailed and informative as we have e. g. no information on what is really eaten and how often individuals

do sports. Additionally, these questions are only included in one or two waves of the SOEP. Therefore, the BMI is investigated in more detail, which is also often done in the literature (see, among others, Cairney and Øsbye 1999 or Antecol and Bedard 2006).

The BMI is an important variable, because overweight and obese are widely recognized as risk factors for a great variety of health conditions (e. g., high blood pressure, cardiovascular disease, diabetes, arthritis, asthma, and some cancers). Hence, regarding the healthy immigrant effect the idea behind is that if the incidence of overweight and/or obese augments with duration of residence in Germany, the deterioration of immigrants' health might follow and can thus contribute to the healthy immigrant effect.
Up to now, the weight and height questions, which are used to calculate the BMI, have been asked in three waves: 2002, 2004, and 2006.
The BMI is calculated as weight in kilograms divided by height in meters squared. It is constructed from two questions in the SOEP:

> *How tall are you? If you don't know, please estimate.*
> *How many kilograms do you currently weigh? If you don't know, please estimate.*

Following the recommendations of the World Health Organisation (WHO), individuals with a BMI of less than 18.5 are considered underweight, between 18.5 and less than 25 they are considered normal weight, between 25 and less than 30 they are considered overweight, and a BMI index of 30 or greater is considered obese.

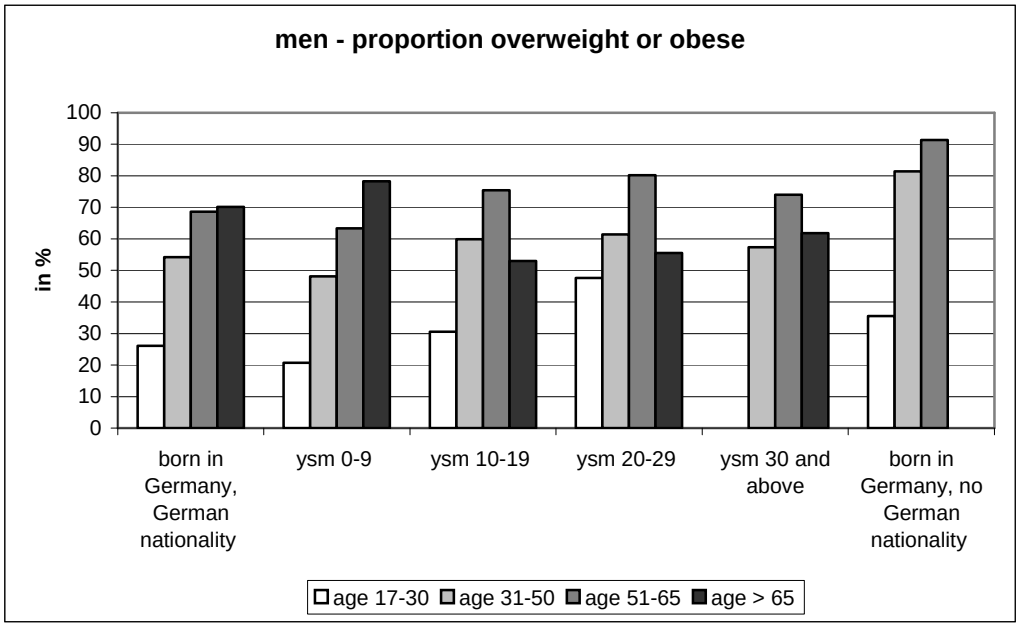
One should be aware that the information on height and weight is self-reported. There is evidence in literature that a systematic downward bias of self-reported weight exists, especially among women (see, for example, Ossiander et al. 2004 or Ezzati et al. 2006).
For SOEP data, it has been shown that especially data on the weight question is sensitive to the interview setting: The absence of an interviewer increases the reported body weight. However, this interviewer effect has been shown to occur only for men (see Kroh 2005). Kroh (2005) found that men reported a body weight of about one kilogram more in an anonymous interview setting

compared to other interview settings. Hence, in the regression, it should be controlled for the presence of an interviewer (following, for example, Cawley et al. 2005).

Figure 4.4 and figure 4.5 display a first descriptive approach to the evolution of overweight and obese with immigrants' duration of residence and compared to individuals born in Germany. As overweight and obese are correlated to age, the figures summarise the proportion of overweight and obese by different age groups. Otherwise, the results would be largely influenced by differences in the mean age of the respective groups.

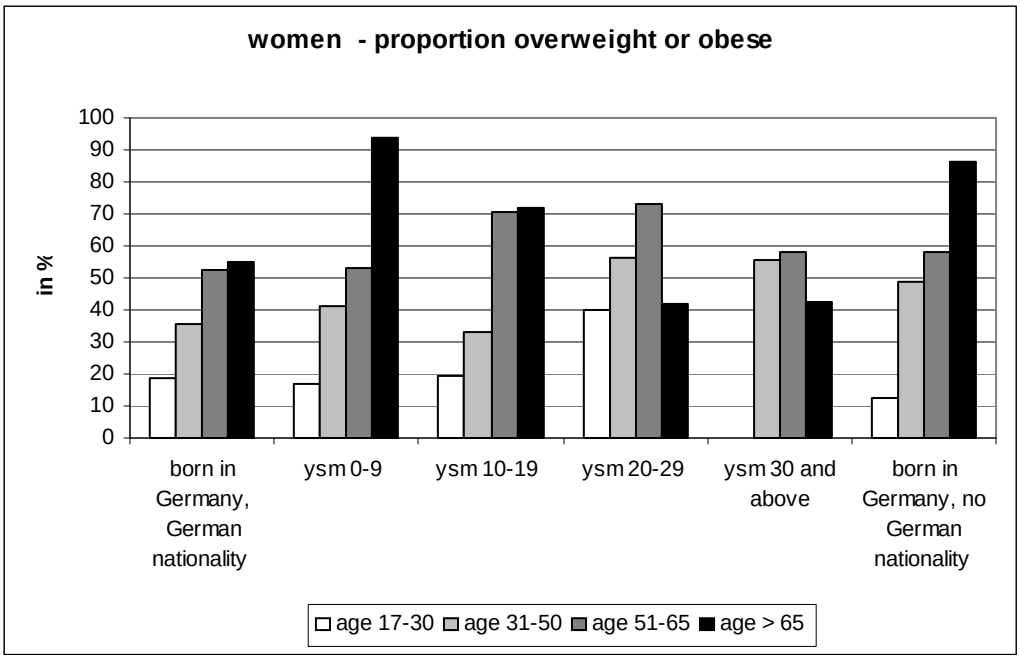
For men, figure 4.4 shows that for the group aged 17 to 30, there is a clear increase in the proportion of individuals being overweight or obese with duration of residence, whereby only 20.7% of recent immigrants (ysm between zero and nine years) are overweight or obese compared to 26% of natives, but with duration of residence between 20 and 29 years the proportion of immigrants being overweight or obese augments to 47.7% (see figure 4.4). For immigrants above the age of 66 this pattern does not appear with recent immigrants in this age group being to a higher degree overweight or obese. This is also found for female immigrants (see figure 4.5). This fits in the general findings for the HIE, that the initial health advantage does not exist for those immigrating at an age above 60 years. Remarkable is furthermore the proportion of overweight and obese in the second-generation, which is in every age group much higher than that of the natives: In the age group 31-50 (51-65) years 54.2% (68.6%) of the natives are overweight or obese compared to 81.4% (91.4%) in the second-generation (see figure 4.4). This pattern also arises for second-generation women with the exception of the youngest age group (see figure 4.5). Overall, a lower percentage of women are overweight compared to men.

Figure 4.4: Distribution of overweight and obese according to age and years since migration for men



Note: overweight is defined as BMI > 25, obese is defined as BMI > 30; there are no observations for age group 17-30 and ysm 30 and above as well as for the second-generation older than 65 years
Source: SOEP, wave 2002, weighted

Figure 4.5: Distribution of overweight and obese according to age and years since migration for women



Note: overweight is defined as BMI > 25, obese is defined as BMI > 30; there are no observations for age group 17-30 and ysm 30 and above, and only few observations for the second-generation older than 65 years
Source: SOEP, wave 2002, weighted

Alcohol consumption

In 2006, for the first time a question with regard to drinking behaviour was included in the SOEP questionnaire:

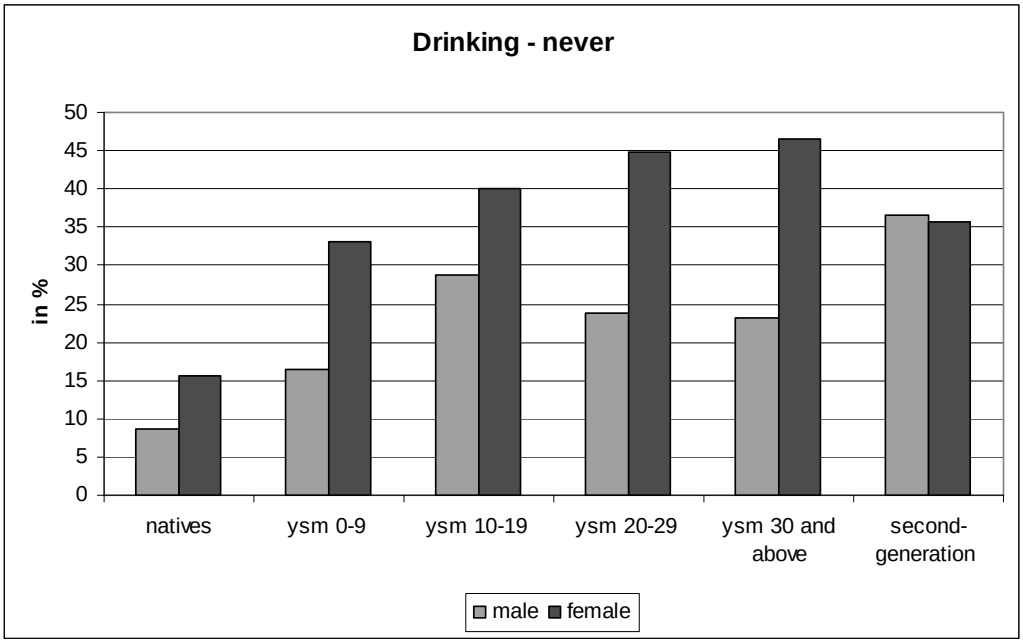
> *How often do you drink the following alcoholic beverages? Beer, wine or champagne, spirits (schnapps, brandy etc.), mixed drinks (alcopops, cocktails etc.)*

with four different categories, respectively: Regularly, occasionally, seldom, or never.

Unfortunately, this is a very vague question, and no information about the exact quantity of alcohol consumption is collected. Nevertheless, a dummy variable is constructed taking the value one for abstainers, hence for those who answered in all four categories to drink the respective alcohol 'never'.

Overall, the proportion of first- and second-generation immigrants which report that they never consume any alcohol is much higher than for natives. With the exception of second-generation immigrant women, the proportion of abstainers is higher among women. Regarding duration of residence, for example about 45% of immigrant women residing more than 20 years in Germany report to drink no alcohol, compared to 30% in the group of newly arrived immigrant women. Also for men, the lowest proportion of abstainers is in the newly arrived immigrant group and the highest proportion of abstainers in the second-generation. In the group of second-generation immigrants, 36.5% of the men and 35.8% of the women report to drink no alcohol, compared to 8.6% of native men and 15.6% of native women. Hence, there is no adaptation pattern over time, but quite the contrary: The longer the duration of residence the higher the proportion of abstainers. However, this figure does not control for important factors influencing drinking behaviour, like religious affiliation. It can be assumed that Moslems are to a large part abstainers. Hence, the above figure might be influenced by a different composition of immigrants over time.

Figure 4.6: Percentage of abstainers by gender and years since migration



Source: SOEP, wave 2006, weighted

Smoking

It is well known, that the consumption of tobacco can cause serious health conditions (e. g., heart disease, stroke, and different forms of cancer). Additionally, smoking is found to reduce life expectancy.

There are several questions in the SOEP with regard to smoking behaviour, for example, questions concerning the average daily amount of cigarettes, pipes, or cigars smoked, the age when the individual began to smoke regularly, or if someone has ever smoked before. Here, the analysis is based only on the current tobacco consumption, and the question in the SOEP is (questionnaire 2002):

Do you currently smoke, be it cigarettes, a pipe or cigars?

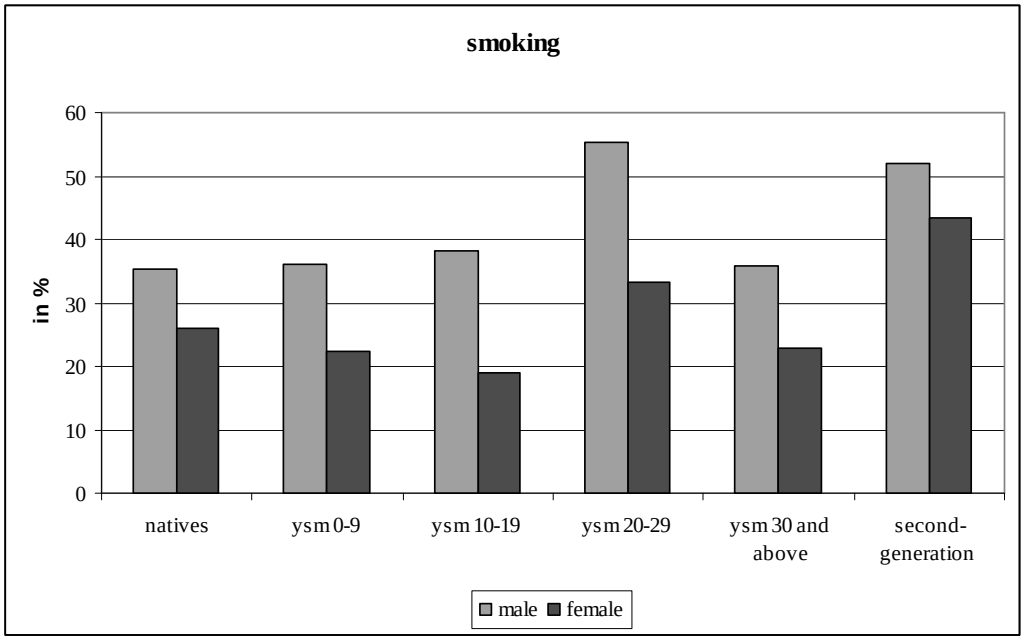
This question has been asked in six waves up to now: 1998, 1999, 2001, 2002, 2004, and 2006.

Figure 4.7 shows the incidence of smoking according to gender and years since migration for the wave 2002 of the SOEP.

Interestingly, immigrant men have – regardless of their duration of residence in Germany – a higher smoking prevalence than German men. In the group of immigrant men with years since migration between 20 and 29 years and second-generation immigrant men more than 50 percent are smokers. Overall, for immigrant men, there is a slight increase in the proportion of smokers with duration of residence (with the exception of more than 30 years of duration of residence). Women smoke less than men in all groups, and for immigrant women, there seems to be no smoking pattern related to years since migration (see figure 4.7).

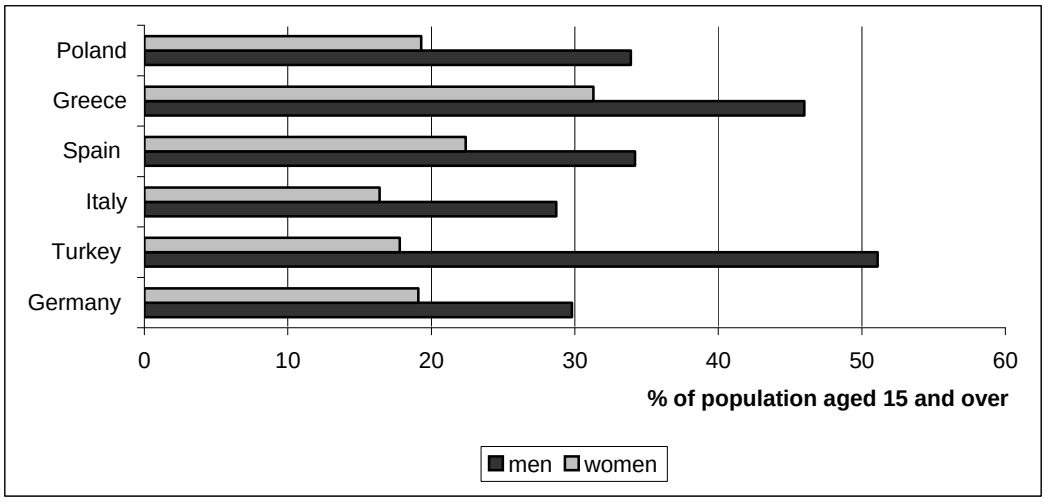
The fact that immigrant men have a higher smoking prevalence than German men disregarding their duration of residence questions the assumption usually made in studies about the health behaviour of immigrants, namely that immigrants behave in a 'healthy' way prior to immigration and adapt to the 'unhealthy' way of living in the host country. Whereas this assumption might be tenable with regard to the BMI and alcohol consumption, it is questionable with regard to smoking behaviour as the smoking prevalence is higher in many other countries (from which individuals migrate to Germany) than in Germany. Figure 4.8 shows the percentage of female and male smokers in 2005 for Germany and some major immigrant source countries. With the exception of Italy, the percentage of male smokers is in all countries higher than in Germany. In Turkey, about every second men is a smoker compared to 30% in Germany. Hence, an adaptation of health behaviour of Turkish immigrants would yield to a lower smoking prevalence with duration of residence.

Figure 4.7: Smoking behaviour according to gender and years since migration



Source: SOEP, wave 2002, weighted

Figure 4.8: Percentage of females and males smoking daily in 2005



Source: OECD 2007: Health at a Glance

4.4.4 Independent variables

The respective dependent variable is expressed as a function of different demographic and socio-economic variables. The following 'migration-related' variables are included: A set of four dummy variables for the *country of origin*

(Eastern European countries, Turkey, other EU-countries, and all other countries, with born in Germany acting as reference); a dummy variable for having *German citizenship*; two dummy variables for *German language skills* (one indicating that an individual speaks German either good or fair, and one indicating that an individual speaks German either poor or not at all, with very good German language skills acting as reference)[35]; *years since migration* (following McDonald and Kennedy (2005: 2472) for individuals born in Germany ysm is set equal to zero); *ysm²* (to capture any possible non-linear effects); a dummy variable for the *second-generation* (defined as being born in Germany, but having no German citizenship); and three dummy variables for the *arrival cohort* ('immigrated between 1955 and 1972', 'immigrated between 1973 and 1989', 'immigrated between 1990 and 2006', with 'immigrated before 1950 or born in Germany' acting as reference). Additionally, to control for possible network effects, the *share of foreigners* (according to the county or district level) is included.

In consistence with literature, the following indicators were included as control variables in the multivariate regression analysis: A dummy variable for *sex* (taking the value one for males); three dummy variables for *age* (one for the age category 26-50 years, one for the age category 51-65 years, and one that takes the value one if the respondent is older than 66, with the age of 16-25 years acting as reference group); *marital status* (single, divorced or separated, and widowed with married acting as reference category); a dummy variable for having *children* in the household; *years of education*; *occupational status* (i. e., dummy variables covering the following possibilities: 'blue collar worker', 'white collar worker', 'training', 'self-employed', 'pensioner, or 'public servant' with 'non-working' or 'jobless' acting as reference group); logarithm of the pre-government *household income* and the logarithm of the *size of the household*[36]; *religious affiliation* (i. e., a dummy variable for Christian, and a dummy variable for other religious affiliations, with undenominational acting

[35] These dummy variables are constructed from a self-assessed question: "In your opinion, how do you speak German?" with five possibilities: Very good, good, fair, poor, or not at all. All natives are assigned very good German language skills.

[36] Schwarze (2003) showed that the inclusion of the logarithm of income and the logarithm of household size is more flexible, because it is not necessary to make any assumptions about the equivalence scale.

as reference group)[37]; and dummy variables for the year. As it has been shown that especially questions on weight are sensitive to the interview setting, a dummy variable indicating the *presence of an interviewer* is additionally included.

Empirical estimations are only carried out for the BMI, alcohol consumption, and smoking. The estimations are taken out with Stata MP/10.0 with the exception of the logistic multilevel models for smoking, which have been estimated using MLwiN 2.02.

4.5 Estimation results

4.5.1 Body Mass Index

Individuals for who there is missing information on either height or weight are excluded from the analysis. Additionally, in line with the literature, individuals with extreme values of the BMI are excluded (BMI < 14 or BMI > 60).
In the empirical analysis the BMI is used as metric dependent variable, because not only being overweight or obese is relevant, but any change in the BMI might be of interest.

The final sample consists of 18,593 individuals of whom are 8,907 men and 9,686 women. All estimations are taken out for the whole sample (table 4.1), and separately for men and women (table 4.2 and table 4.3, respectively). For each subsample, a random-effects model, a fixed-effects model, and a multilevel model are estimated.

In the multilevel model, the estimated variance between regions is $\sigma^2_v = 0.32$ and the estimated variance between individuals within a given region is $\sigma^2_\alpha = 14.49$ (table 4.1). The proportion of the total residual variation that is due to

[37] During the analysed timeframe, the question with regard to religious affiliation was only included in 2003. Hence, for all individuals, the answer to this question from 2003 is implemented for all other years. The question distinguished between undenominational individuals, Christians, and 'other religions'. The group of 'other religions' includes Buddhism, Islam, and Jehovah's Witness, whereby most of the individuals in this group (about 95%) are Moslems.

differences between regions and individuals, respectively, can be calculated in the following way:

$$\rho(region) = \frac{\sigma_v^2}{\sigma_v^2 + \sigma_\alpha^2 + \sigma_\varepsilon^2} \tag{4.6}$$

$$\rho(individual) = \frac{\sigma_\alpha^2}{\sigma_v^2 + \sigma_\alpha^2 + \sigma_\varepsilon^2} \tag{4.7}$$

Hence, the estimated intraclass correlation on the regional level is only 1.83% (for the total sample) and the estimated intraclass correlation on the individual level is 83.88% (for the total sample). An intraclass correlation on the regional level of about 2% is a common finding in literature.

Comparing the random-effects model and the multilevel model using Akaike's Information Criterion (AIC), the random-effects model with only individual specific-effects is preferred over the multilevel model (i. e., the random-effects model with individual-specific and regional-specific effects).

The so-called Hausman test, a standard specification test usually applied for the choice of either the random-effects or the fixed-effects model (see, for example, Wooldridge 2002), is in favour of the fixed-effects model. Nevertheless, it has been shown that the fixed-effects estimator is inefficient for variables with small within variance (see section 4.4.2 and the references therein). As only three waves are available in the case at hand, a small within variance is an important issue in this analysis. In addition, in the fixed-effects model, there are no results for the time-constant variables. Hence, in the following interpretation and discussion of the estimation results, it is generally referred to the random-effects model with individual-specific effects.

The *country of origin* shows only a significant effect for male immigrants from ‘other countries’: Men born in ‘other countries’ have a 4.23 points lower BMI than individuals born in Germany. Having *German citizenship* seems to have no influence on the BMI. Having poor *German language skills* yield a higher BMI for all groups, but the effect is only significant for the total sample and

the women sample. This contradicts the idea that the BMI increases with acculturation, as having poor language skills hints towards lower acculturation and hence, on theoretical grounds of the acculturation theory, one would have expected a negative sign. The coefficient of *years since migration* is for all samples (and for all models) positive and significant. This indicates that the BMI increases with additional years in Germany and supports the idea that changes in lifestyle and environment might lead to a weight gain. This result is in line with the results found for the United States and Canada (see section 4.3). Years since migration squared has mostly a negative and significant coefficient, indicating a convex relationship between the BMI and ysm: The BMI increases with additional years in Germany, but to a decreasing degree. The higher the *share of foreigners* on the county level the lower the BMI in the random-effects model for all samples. This is in accordance with the idea that the higher the concentration of foreigners in a region, the less likely immigrants are to adopt their health behaviour, and hence, in the case at hand, the lower is their BMI. For example, McDonald and Kennedy (2005) noted that the extent of adaptation depends "on the concentration and behaviour of people in the same geographic area who are of similar ethnic background, culture and language to the immigrant" (p.: 2470). Assuming, for example, that the change in dietary habits depends on the higher availability and the lower price of certain food in the host country compared to the immigrants' home country. Then – as Chiswick and Miller (2002) suggested – it might be easier for the immigrants to retain traditional dietary habits in areas with a higher concentration of particular ethnic groups, because in these areas the market for traditional goods is large enough to allow the supply of these goods at reasonable prices.

Regarding the control variables, *men* are found to have a higher BMI, which was expected, as men are usually heavier due to physical circumstances involving more muscle mass. For *age*, it is found that older individuals have a higher BMI in comparison to individuals aged between 16 and 25 years. Being *widowed, single, or divorced* is associated with a significantly lower BMI (being widowed is thereby only significant in the fixed-effects model for the total sample and in the random-effects model of the men sample). This is

consistent with literature, where it has been shown that married individuals have a higher BMI. This is often explained by eating habits which might change with marriage. The coefficient for *children* is also significant and negative in all samples. In literature, the effect of children on the BMI is also explained by eating habits. A higher *socio-economic status (*higher household income, more years of education, being a house owner) is found to be associated with a smaller BMI. However, in the fixed-effects model, the coefficient for years of education turns significantly positive for all samples. Regarding the *occupational status*, individuals in training or white collar workers have a significantly lower BMI than non-working or jobless individuals. For men, a significant effect is only found for being in training. *Religious affiliation* has only a significant impact on the BMI of women: Being Christian lowers the BMI in comparison to being undenominational. As expected, the *presence of an interviewer* reduces the BMI, this effect is only found to be significant in the fixed-effects model. The *year dummy variables* (which are not shown explicitly in the tables) are both positive and significant, indicating – as for example McDonald and Kennedy (2005) noted – a secular trend in weight increase over time. The *cohort dummy variables* (which are also not shown explicitly in the tables) are positive for all models and samples, but they are not significant.

Table 4.1: Estimation results: BMI, total sample

variables	random-effects model		fixed-effects model		multilevel model	
Germany	-		-		-	
other EU-countries	-2.596	(1.928)			-2.760	(1.914)
Turkey	-1.852	(1.947)			-2.043	(1.933)
Eastern Europe	-2.050	(1.926)			-2.283	(1.912)
other countries	-3.219*	(1.947)			-3.444*	(1.931)
German citizenship	0.031	(0.174)	0.208	(0.224)	0.022	(0.174)
German very good	-		-		-	
German good/fair	0.133	(0.099)	0.006	(0.112)	0.125	(0.099)
German poor/not	0.377**	(0.169)	0.182	(0.190)	0.357**	(0.169)
ysm	0.092***	(0.029)	0.157***	(0.033)	0.099***	(0.029)
ysm^2	-0.001*	(0.001)	-0.001	(0.001)	-0.001*	(0.001)
second-generation	-0.142	(0.280)	0.487	(0.472)	-0.127	(0.275)
share of foreigners	-0.021***	(0.005)	-0.001	(0.011)	-0.022***	(0.009)
control variables						
male	1.325***	(0.060)	-		1.334***	(0.058)
aged 16-25	-		-		-	
aged 26-50	0.911***	(0.065)	0.575***	(0.074)	0.978***	(0.067)
aged 51-65	1.493***	(0.080)	0.964***	(0.096)	1.579***	(0.082)
above 66 years	1.475***	(0.094)	1.220***	(0.112)	1.562***	(0.095)
married	-		-		-	
widowed	-0.093	(0.094)	-0.279**	(0.132)	-0.070	(0.094)
single	-1.205***	(0.064)	-0.823***	(0.089)	-1.241***	(0.065)
divorced	-0.541***	(0.067)	-0.433***	(0.083)	-0.526***	(0.068)
children	-0.254***	(0.043)	-0.170***	(0.048)	-0.272***	(0.044)
years of education	-0.174***	(0.012)	0.112***	(0.034)	-0.175***	(0.012)
non-working	-		-		-	
training	-0.579***	(0.068)	-0.294***	(0.075)	-0.571***	(0.070)
self-employed	-0.070	(0.073)	-0.002	(0.083)	-0.050	(0.074)
pensioner	0.085	(0.055)	0.086	(0.061)	0.085	(0.055)
public servant	-0.094	(0.110)	-0.129	(0.140)	-0.073	(0.111)
white collar	-0.133***	(0.044)	-0.141***	(0.048)	-0.117***	(0.045)
blue collar	-0.049	(0.047)	-0.124**	(0.051)	-0.035	(0.047)
own dwelling	-0.125***	(0.041)	0.039	(0.051)	-0.124***	(0.042)
log hh income	-0.056***	(0.015)	-0.017	(0.017)	-0.059***	(0.015)
log household size	0.177**	(0.073)	0.016	(0.085)	0.201***	(0.075)
undenominational	-		-		-	
Christian	-0.121*	(0.068)			-0.062	(0.071)
other religion	-0.251	(0.224)			-0.271	(0.222)
interviewer present	-0.030	(0.033)	-0.144***	(0.038)	-0.025	(0.034)
constant	26.614***	(0.264)	23.677***	(0.474)	26.496***	(0.270)
cohort dummies	yes		no		yes	
time dummies	yes		no		yes	
R^2 within	0.02		0.02			
R^2 between	0.13		0.04			
R^2 overall	0.12		0.03			
Log restricted-likelihood					-116672.18	
σ_v	-				0.563	
σ_α	3.830				3.807	
σ_ε	1.565				1.571	
# observations	48,302		48,302		48,302	
# individuals	18,593		18,593		18,593	

Standard error in parentheses; *** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP waves 2002, 2004, 2006, own calculations

Table 4.2: Estimation results: BMI, only men

variables	random-effects model		fixed-effects model		multilevel model	
Germany	-		-		-	
other EU-countries	-3.142	(2.272)			-2.936	(2.258)
Turkey	-2.927	(2.301)			-2.738	(2.286)
Eastern Europe	-3.072	(2.274)			-2.928	(2.258)
other countries	-4.234*	(2.330)			-4.101*	(2.310)
German citizenship	0.182	(0.234)	0.371	(0.295)	0.177	(0.234)
German very good	-		-		-	
German good/fair	0.127	(0.127)	0.122	(0.143)	0.140	(0.128)
German poor/not	0.149	(0.230)	0.326	(0.259)	0.161	(0.230)
ysm	0.108***	(0.039)	0.210***	(0.045)	0.107***	(0.039)
ysm^2	-0.001	(0.001)	-0.002*	(0.001)	-0.001	(0.001)
second-generation	-0.078	(0.374)	0.181	(0.686)	-0.127	(0.367)
share of foreigners	-0.024***	(0.007)	-0.018	(0.014)	-0.021**	(0.009)
control variables						
aged 16-25	-		-		-	
aged 26-50	0.932***	(0.089)	0.496***	(0.102)	0.972***	(0.091)
aged 51-65	1.328***	(0.109)	0.758***	(0.130)	1.373***	(0.110)
above 66 years	1.209***	(0.127)	0.905***	(0.152)	1.254***	(0.129)
married	-		-		-	
widowed	-0.333**	(0.164)	-0.372	(0.227)	-0.300*	(0.164)
single	-1.175***	(0.084)	-0.579***	(0.121)	-1.201***	(0.085)
divorced	-0.393***	(0.094)	-0.322***	(0.117)	-0.373***	(0.096)
children	-0.218***	(0.058)	-0.204***	(0.065)	-0.236***	(0.059)
years of education	-0.122***	(0.015)	0.107**	(0.045)	-0.125***	(0.015)
non-working	-		-		-	
training	-0.572***	(0.092)	-0.381***	(0.103)	-0.555***	(0.094)
self-employed	0.081	(0.096)	0.058	(0.109)	0.109	(0.096)
pensioner	0.076	(0.079)	0.102	(0.088)	0.086	(0.080)
public servant	0.028	(0.139)	-0.054	(0.183)	0.047	(0.140)
white collar	0.030	(0.072)	-0.038	(0.079)	0.066	(0.073)
blue collar	-0.017	(0.063)	-0.097	(0.067)	0.008	(0.064)
own dwelling	0.021	(0.054)	0.083	(0.068)	0.037	(0.056)
log household income	-0.034	(0.021)	-0.034	(0.024)	-0.039*	(0.021)
log household size	0.224**	(0.095)	0.114	(0.112)	0.250**	(0.098)
undenominational	-		-		-	
Christian	0.000	(0.086)			0.019	(0.088)
other religion	-0.358	(0.287)			-0.352	(0.282)
interviewer present	-0.059	(0.044)	-0.138***	(0.051)	-0.063	(0.045)
constant	26.959***	(0.349)	24.210***	(0.638)	26.880***	(0.353)
cohort dummy variables	yes		no		yes	
time dummy variables	yes		no		yes	
Log restricted-likelihood					-53937.361	
R^2 within	0.03		0.02			
R^2 between	0.11		0.02			
R^2 overall	0.09		0.02			
σ_v	-				0.489	
σ_α	3.455				3.431	
σ_ε	1.456				1.463	
# observations	23,116		23,116		23,116	
# individuals	8,907		8,907		8,907	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP waves 2002, 2004, 2006, own calculations

Table 4.3: Estimation results: BMI, only women

variables	random-effects model		fixed-effects model		multilevel model	
Germany	-		-		-	
other EU-countries	-2.192	(3.261)			-2.205	(3.246)
Turkey	-0.850	(3.281)			-0.915	(3.268)
Eastern Europe	-1.140	(3.252)			-1.259	(3.238)
other countries	-2.324	(3.242)			-2.427	(3.228)
German citizenship	-0.114	(0.255)	0.029	(0.334)	-0.122	(0.255)
German very good	-		-		-	
German good/fair	0.144	(0.152)	-0.125	(0.174)	0.122	(0.152)
German poor/no	0.485**	(0.247)	0.031	(0.278)	0.446*	(0.246)
ysm	0.077*	(0.043)	0.114**	(0.049)	0.088**	(0.043)
ysm^2	-0.001	(0.001)	-0.001	(0.001)	-0.001	(0.001)
second-generation	-0.188	(0.411)	0.596	(0.657)	-0.123	(0.403)
share of foreigners	-0.020***	(0.007)	0.016	(0.016)	-0.028**	(0.011)
control variables						
aged 16-25	-		-		-	
aged 26-50	0.898***	(0.095)	0.631***	(0.106)	0.981***	(0.097)
aged 51-65	1.634***	(0.117)	1.143***	(0.139)	1.744***	(0.119)
above 66 years	1.712***	(0.137)	1.500***	(0.164)	1.824***	(0.139)
married	-		-		-	
widowed	-0.171	(0.120)	-0.269	(0.168)	-0.158	(0.120)
single	-1.241***	(0.097)	-1.031***	(0.130)	-1.280***	(0.098)
divorced	-0.661***	(0.095)	-0.522***	(0.118)	-0.650***	(0.100)
children	-0.294***	(0.064)	-0.139*	(0.072)	-0.317***	(0.065)
years of education	-0.225***	(0.019)	0.114**	(0.050)	-0.225***	(0.018)
non-working	-		-		-	
training	-0.559***	(0.100)	-0.184*	(0.111)	-0.562***	(0.104)
self-employed	-0.232**	(0.115)	-0.032	(0.126)	-0.233**	(0.116)
pensioner	0.127*	(0.077)	0.087	(0.084)	0.119	(0.077)
public servant	-0.247	(0.177)	-0.155	(0.216)	-0.214	(0.180)
white collar	-0.219***	(0.058)	-0.177***	(0.063)	-0.218***	(0.059)
blue collar	-0.051	(0.073)	-0.133*	(0.078)	-0.041	(0.074)
own dwelling	-0.260***	(0.060)	-0.006	(0.075)	-0.269***	(0.062)
log hh income	-0.073***	(0.021)	-0.007	(0.024)	-0.079***	(0.021)
log household size	0.143	(0.110)	-0.074	(0.128)	0.187	(0.114)
undenominational	-		-		-	
Christian	-0.255**	(0.104)			-0.189*	(0.107)
other religion	-0.106	(0.341)			-0.111	(0.339)
interviewer present	0.001	(0.049)	-0.147***	(0.056)	0.012	(0.050)
constant	27.526***	(0.395)	23.229***	(0.699)	27.433***	(0.399)
cohort dummy variables	yes		no		yes	
time dummy variables	yes		no		yes	
Log restricted-likelihood					-62440.598	
R^2 within	0.03		0.02			
R^2 between	0.13		0.05			
R^2 overall	0.12		0.04			
σ_v	-				0.587	
σ_α	4.106				4.093	
σ_ε	1.657				1.664	
# observations	25,186		25,186		25,186	
# individuals	9,686		9,686		9,686	

Standard error in parentheses; *** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP waves 2002, 2004, 2006, own calculations

To check the robustness of the results, the random-effects model has been reestimated separately for the Turks, Eastern European immigrants, and immigrants from other EU-countries to avoid the confounding of possible ethnic differences with years since migration. Due to the small sample size, it is not possible to estimate the regression for the group of "other countries" separately. Additionally, due to the small sample size, the estimation is taken out only for the total sample, and not separately for men and women. In order to avoid a large number of tables, I will only shortly discuss the results for years since migration. The estimation results are available upon request.
For the Turkish sample and for the sample of immigrants from other EU-countries, the coefficient for ysm is significantly positive; indicating that the BMI of Turks and immigrants from other EU countries is increasing with an additional year in Germany. For Eastern European immigrants, the effect of ysm is found to be positive, but not significant.

4.5.2 Alcohol consumption

As the question on alcohol consumption is so far only included in one wave, only a cross-sectional analysis can be carried out. It is therefore not possible to distinguish between cohort effects and period effects, which can be misleading if the cohort quality changes over time (see Borjas 1985). This should be taken in mind in the interpretation of the estimation results.

As the dependent variable is a dummy variable, taking the value one for the abstainers, and zero if the individual reports to consume alcohol for at least one alcohol category, a multilevel logistic regression is estimated. Please note that the data have only a two-level structure in this case as there is no time dimension in cross-sectional data. Hence, only a regional-specific random effect is included in the estimation equation. For an individual i in county/district k, consider the model for $\pi_{ik} = P(\text{abstainer}_{ik} = 1)$:

$$\text{logit}(\pi_{ik}) = ß_0 + x'_{ik}ß + v_{0k} \qquad (4.6)$$

whereby x'_{ik} is a vector of K explanatory variables without a constant, ß is the corresponding coefficient vector and v_{0k} represents regional-specific random effects (see, among others, Rabe-Hesketh and Skrondal 2008; Snijders and Bosker 1999 for a detailed outline of the multilevel logistic regression model).

The variance partition coefficient (VPC), hence the intraclass correlation coefficient, is in a multilevel logistic model not that easy to compute as in a continuous multilevel model (see chapter 4.5.1) as the level-1 variance is a function of the mean probability that depends on the predictors of the regression model. Hence, the level-1 variance is heteroscedastic and thus not constant. However, it has been suggested to approximate this variance component using a threshold model, whereby the stochastic error term is assumed to have a standard logistic distribution and variance $\pi^2 / 3 \approx 3.29$ (see, for example, Snijders and Bosker 1999: 224). Hence, the variance partition coefficient can be calculated in the following way:

$$\text{VPC} = \rho(region) = \frac{\sigma_v^2}{\sigma_v^2 + 3.29} \qquad (4.7)$$

Using this formula, the estimated intraclass correlation on the regional level is about 3% for the total sample, about 1.7% in the men sample, and about 2.5% in the women sample.

The estimation is taken out for the total sample, and separately for men and women. The final sample consists of 14,713 individuals of whom are 6,963 men and 7,750 women. The results can be found in table 4.4.

For men, the *country of origin* seems to have no significant influence on the probability of being abstinent. In contrast, women born in Turkey and women born in ‘other countries’ have a significantly higher probability of being abstinent. *German citizenship* seems to have no influence on the probability of being abstinent. Having good/fair or poor/no *German language skills* highers the probability of being abstinent in comparison to having very good German language skills for all subsamples. However, only the coefficient for good/fair

German language skills is significant. This is in line with the acculturation hypothesis as individuals who have poor language skills can be seen as less acculturated and thus have a higher probability of being abstinent. The coefficient for *years since migration* is positive for all subsamples, indicating that the probability of being an abstainer increases with additional years in Germany. This contradicts the acculturation hypothesis. However, none of the estimated coefficients is significant. The dummy variable for the *second-generation* is in all subsamples highly significant and positive, and hence, an individual born in Germany having no German citizenship has a higher probability of being abstinent. This contradicts the acculturation hypothesis, where higher alcohol consumption in the second-generation might have been expected (see, for example, Dill et al. 2002). An explanation for that finding could be a kind of 'new-conservatism' of the second-generation. A higher *share of foreigners* on the county level yield a significantly (with the exception of the women sample) higher probability of never drinking any alcohol. This is in line with the hypothesis that the higher the share of foreigners the less acculturation takes place.

With regard to the control variables, it is found that *men* have a lower probability of being abstinent. Concerning the *marital status*, widowed, single, and divorced individuals all have a higher probability of being an abstainer than married individuals. A higher *socio-economic status* (more years of education, house ownership, or a higher household income) reduces the probability of being abstinent. With regard to the *occupational status*, in comparison to be either non-working or jobless, being in training, self-employed, a public servant, or a blue or white collar worker lowers the probability of being abstinent significantly for all subsamples, whereas being a pensioner highers the probability of being abstinent. This effect is only significant for women. *Religious affiliation* seems to be a very important influence factor on the probability of being abstinent. Those who belong to the category 'other religion' have in all subsamples a significantly higher probability of being abstinent than individuals who are undenominational. 'Other religion' includes Buddhism, Islam, and Jehovah's Witness, but most of the individuals in this group (about 95%) are Moslems. Finally, when an

interviewer has been present, women are more likely to report to be abstinent than in any other interview setting.

Table 4.4: Estimation results: Alcohol consumption, multilevel logistic model

variables	total sample		only men		only women	
country of origin						
Germany	-		-		-	
other EU-countries	0.355	(0.442)	-0.160	(0.698)	0.652	(0.594)
Turkey	0.845*	(0.460)	0.240	(0.714)	1.391**	(0.633)
Eastern Europe	0.321	(0.342)	0.062	(0.532)	0.594	(0.652)
other countries	1.330***	(0.441)	0.473	(0.710)	1.789***	(0.582)
German citizenship	0.350	(0.232)	0.401	(0.366)	0.395	(0.311)
language skills						
German very good	-		-		-	
German good/fair	0.459**	(0.191)	0.495*	(0.287)	0.523**	(0.263)
German poor/no	0.393	(0.283)	0.122	(0.421)	0.636	(0.418)
ysm	0.023	(0.029)	0.043	(0.045)	0.013	(0.039)
ysm^2	-0.001	(0.001)	-0.001	(0.001)	-0.001	(0.001)
second-generation	1.134***	(0.273)	0.990**	(0.421)	1.291***	(0.368)
share of foreigners	0.014**	(0.007)	0.017*	(0.010)	0.010	(0.008)
control variables						
male	-0.745***	(0.058)	-		-	
age						
aged 16-25	-		-		-	
aged 26-50	0.283*	(0.171)	0.120	(0.260)	0.314	(0.229)
aged 51-65	0.426**	(0.191)	0.404	(0.296)	0.409	(0.252)
above 66 years	0.526**	(0.211)	0.377	(0.337)	0.562*	(0.273)
marital status						
married	-		-		-	
widowed	0.315***	(0.098)	0.440**	(0.210)	0.239**	(0.114)
single	0.304***	(0.100)	0.329**	(0.160)	0.255**	(0.131)
divorced	0.323***	(0.093)	0.439***	(0.164)	0.251**	(0.114)
children	-0.108	(0.091)	-0.143	(0.153)	-0.056	(0.114)
years of education	-0.126***	(0.014)	-0.110***	(0.023)	-0.138***	(0.018)
occupational status						
non-working	-		-		-	
training	-0.641***	(0.206)	-0.559*	(0.306)	-0.720**	(0.279)
self-employed	-0.671***	(0.160)	-0.752***	(0.237)	-0.650***	(0.230)
pensioner	0.138	(0.107)	-0.091	(0.190)	0.131**	(0.260)
public servant	-0.344*	(0.205)	-0.750**	(0.322)	-0.028	(0.274)
white collar	-0.719***	(0.094)	-0.723***	(0.187)	-0.690***	(0.112)
blue collar	-0.519***	(0.097)	-0.723***	(0.164)	-0.319**	(0.127)
own dwelling	-0.247***	(0.060)	-0.135	(0.100)	-0.291***	(0.074)
log income	-0.054**	(0.025)	-0.105**	(0.045)	-0.035	(0.031)
log household size	0.540***	(0.128)	0.602***	(0.204)	0.488***	(0.166)
undenominational	-	-	-		-	
Christian	0.011	(0.070)	-0.016	(0.108)	0.091	(0.088)
other religion	1.661***	(0.154)	1.623***	(0.229)	1.829***	(0.216)
interviewer present	0.228***	(0.060)	0.148	(0.099)	0.279***	(0.074)
constant	-1.531***	(0.388)	-2.198***	(0.609)	-1.586***	(0.509)
log likelihood	-5049.658		-1922.301		-3116.209	
σ_v	0.33		0.24		0.29	
# observations	14,713		6,963		7,750	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Note: Dependent variable takes the value one for abstainers, and zero otherwise
Source: SOEP wave 2006, own calculations

4.5.3 Smoking

As alcohol consumption, smoking behaviour is measured binary with the value one for smokers and zero for non-smokers. As panel data are available, the data at hand have a three-level structure as outlined exemplary in section 4.4.2 for a continuous dependent variable. As for the BMI, three different models are estimated for smoking behaviour: A random-effects logit (RE-logit) model, a fixed-effects logit (FE-logit) model, and to take into account the three-level structure of the data, a multilevel logistic model. The RE-logit and the FE-logit models have been estimated using Stata (for a discussion of the RE-logit and the FE-logit models see section 3.4.7 and the references therein). As computation time is very high for the multilevel logistic model in Stata, this model has been estimated using MLwiN (see section 4.5.2 for an outline of the two-level logistic model and the references therein). As for binary response multilevel models maximum likelihood estimation is computationally intensive, quasi-likelihood methods have been implemented in MLwiN. There are two types of approximation available in MLwiN, namely marginal quasi-likelihood (MQL) and predictive quasi-likelihood (PQL), which can both include the 1^{st} order terms or 2^{nd} order terms of the Taylor series expansion (see Rasbash et al. 2005: 111). As noted by Rasbash et al. (2005: 111), the 1st order MQL procedure provides the crudest approximation; therefore estimates might be biased downwards. The 2^{nd} order PQL is seen as an improved approximation procedure, however, it yield convergence problems. Hence, Rasbash et al. (2005) suggested the application of the 1^{st} order PQL, which is therefore used in the case at hand.

All estimations are taken out for the whole sample (table 4.5), and separately for men and women (table 4.6 and table 4.7).
The final sample consists of 19,084 individuals (9,109 men and 9,975 women). The sample is unbalanced and encompasses overall 85,914 person-years. In the FE-logit model the sample size is remarkably reduced to 3,349 individuals (1,780 men and 1,569 women), because it is only possible to estimate the FE-logit model for those individuals who changed there smoking behaviour in the analysed timeframe. Hence, in the sample at hand, 15,736 individuals are either smokers or non-smokers in all waves. This should be taken in mind in

the interpretation of the estimation results. Again, the Hausman test is in favour of the FE-logit model.

Using the same formula to compute the intraclass correlation as outlined in section 4.5.2, the estimated intraclass correlation on the regional level is about 5.8% (for the total sample) and the estimated intraclass correlation on the individual level is about 54% (for the total sample). In comparison to the estimated intraclass correlation for the BMI and for alcohol consumption, the intraclass correlation on the regional level is found to be higher for smoking. However, in comparison to the intraclass correlation on the individual level, the intraclass correlation on the regional level is rather low.

In the following it is generally referred to the random-effects model of the total sample and if there are qualitative differences between the three models and/or men and women, it will be displayed.
With regard to the *country of origin*, men from 'other European countries' and from Turkey are found to have a significantly higher probability of smoking than men born in Germany. For women, the country of origin has no significant effect. Having *German citizenship* increases the probability of smoking for men, again for women, no significant effect is found. With regard to *German language skills*, ambiguous results are found. Having only good or fair language skills lowers the smoking probability for all subsamples significantly in comparison to very good language skills. This supports the acculturation hypothesis. However, regarding poor or no German language skills the results differ significantly for men and women. Whereas for women, the results are in line with good or fair language skills, thus lowering the probability of smoking significantly, for men, having poor or no German language skills highers the probability of smoking significantly. The influence of *years since migration* is also found to be different for men and women. For men, the probability to smoke decreases with duration of residence in Germany, but the coefficient is not significant. Nevertheless, taking into account, that in many immigrant source countries, the smoking probability for men is higher than in Germany (see figure 4.8), the results can be interpreted as support for the acculturation hypotheses. Thereby acculturation comes along

with ‘good’ health behaviour, which has so far not been taken into account in literature. In contrast, for women, the probability of smoking increases with additional years of residence in Germany. Hence, for women, support for the acculturation hypothesis is found. The higher the *share of foreigners* the higher is the probability to smoke for women. This finding contradicts the acculturation hypothesis. For men the influence of the share of foreigners on the county level seems to have no influence.

With regard to the control variables, *men* are found to have a higher probability to smoke, which has been expected. A higher *age* decreases the probability to smoke significantly. Concerning *marital status*, it is found for all subsamples that being widowed, single, or divorced lead to a higher probability to smoke compared to married individuals. The presence of *children* in the household seems to increase the probability of smoking. A higher *socio-economic status* (more years of education, higher household income, and house ownership) is associated with a lower smoking probability. This is in line with literature, where it has been shown that smoking is more prevalent for individuals with a low socio-economic status (see, for example, Lampert and Kroll 2005). With regard to *religious affiliation*, Christians or members of any other church have a significantly lower probability to smoke than undenominational individuals. Finally, for the *presence of an interviewer*, no clear results are found.

Table 4.5: Estimation results: Smoking, total sample

variables	random-effects logit		fixed-effects logit		multilevel model	
country of origin			-			
Germany	-				-	
other EU-countries	4.996*	(2.682)			2.142	(1.368)
Turkey	5.049*	(2.719)			2.258*	(1.378)
Eastern Europe	2.475	(2.685)			1.619	(1.362)
other countries	1.821	(2.699)			1.378	(1.376)
German citizenship	0.722**	(0.303)	1.491***	(0.407)	-0.003	(0.159)
language skills						
German very good	-		-		-	
German good/fair	-0.371**	(0.171)	-0.400**	(0.186)	-0.252**	(0.103)
German poor/not	-0.394	(0.287)	-0.085	(0.308)	-0.235	(0.177)
ysm	0.046	(0.041)	0.002	(0.043)	0.023	(0.025)
ysm^2	-0.000	(0.001)	-0.001	(0.001)	0.000	(0.001)
second-generation	0.502	(0.454)	0.509	(0.601)	0.069	(0.214)
share of foreigners	0.031***	(0.008)	-0.013	(0.014)	0.016***	(0.004)
control variables						
male	1.862***	(0.100)	-		0.701***	(0.040)
age						
aged 16-25	-		-		-	
aged 26-50	-0.101	(0.104)	-0.137	(0.105)	-0.117*	(0.066)
aged 51-65	-1.689***	(0.136)	-1.003***	(0.153)	-0.885***	(0.082)
above 66 years	-3.157***	(0.178)	-1.822***	(0.221)	-1.785***	(0.108)
marital status						
married	-		-		-	
widowed	0.314*	(0.172)	0.526*	(0.292)	0.218**	(0.095)
single	1.073***	(0.102)	0.838***	(0.123)	0.410***	(0.055)
divorced	1.291***	(0.117)	0.360***	(0.129)	0.846***	(0.061)
children	0.266***	(0.072)	0.093	(0.077)	0.115**	(0.045)
years of education	-0.286***	(0.017)	-0.001	(0.026)	-0.162***	(0.009)
occupational status						
non-working	-		-		-	
training	-0.534***	(0.110)	-0.005	(0.110)	-0.387***	(0.073)
self-employed	0.405***	(0.131)	0.619***	(0.149)	0.099	(0.079)
pensioner	-0.983***	(0.112)	-0.407***	(0.129)	-0.572***	(0.070)
public servant	-0.495**	(0.193)	-0.092	(0.253)	-0.277***	(0.105)
white collar	0.292***	(0.080)	0.562***	(0.086)	-0.013	(0.050)
blue collar	0.651***	(0.082)	0.623***	(0.088)	0.258***	(0.052)
own dwelling	-0.729***	(0.071)	-0.041	(0.083)	-0.542***	(0.040)
loghousehold income	-0.024	(0.028)	-0.029	(0.031)	-0.020	(0.018)
log household size	-0.300**	(0.123)	-0.320**	(0.136)	-0.052	(0.073)
undenominational	-		-		-	
Christian	-1.026***	(0.115)			-0.314***	(0.047)
other religion	-0.772**	(0.393)			-0.459***	(0.152)
interviewer present	0.042	(0.058)	-0.060	(0.066)	0.081**	(0.035)
constant	-0.593	(0.443)	-		1.155***	(0.233)
cohort dummy variables	yes		no		yes	
time dummy variables	yes		no		yes	
σ_v					0.69	
σ_α	2.59				2.10	
# observations	85,914		16,157		85,914	
# individuals	19,084		3,349		19,084	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP waves 1998, 1999, 2001, 2002, 2004, 2006 , own calculations

Table 4.6: Estimation results: Smoking, only men

variables	random-effects logit		fixed-effects logit		multilevel model	
country of origin			-			
Germany	-				-	
other EU-countries	8.335**	(3.491)			4.516**	(2.088)
Turkey	8.803**	(3.568)			4.637**	(2.104)
Eastern Europe	4.653	(3.528)			3.413*	(2.079)
other countries	5.000	(3.643)			3.747*	(2.109)
German citizenship	0.784*	(0.421)	0.941*	(0.485)	0.215	(0.230)
language skills						
German very good	-		-		-	
German good/fair	-0.189	(0.229)	-0.437*	(0.235)	-0.133	(0.140)
German poor/not	0.910**	(0.398)	0.365	(0.395)	0.640**	(0.250)
ysm	-0.019	(0.055)	-0.087	(0.056)	-0.001	(0.034)
ysm^2	0.000	(0.001)	-0.000	(0.001)	0.000	(0.001)
second-generation	0.626	(0.619)	0.558	(0.706)	0.218	(0.304)
share of foreigners	0.005	(0.011)	-0.015	(0.020)	0.005	(0.006)
control variables						
age						
aged 16-25	-		-		-	
aged 26-50	0.105	(0.151)	-0.041	(0.151)	0.074	(0.096)
aged 51-65	-1.443***	(0.193)	-1.027***	(0.217)	-0.666***	(0.118)
above 66 years	-2.513***	(0.244)	-1.555***	(0.295)	-1.364***	(0.152)
marital status						
married	-		-		-	
widowed	0.982***	(0.297)	0.556	(0.435)	0.667***	(0.166)
single	0.894***	(0.143)	0.706***	(0.173)	0.326***	(0.077)
divorced	1.253***	(0.175)	0.365*	(0.199)	0.800***	(0.093)
children	0.265**	(0.103)	0.170	(0.110)	0.075	(0.065)
years of education	-0.303***	(0.023)	0.018	(0.034)	-0.162	(0.012)
occupational status						
non-working	-		-		-	
training	-1.050***	(0.162)	-0.308*	(0.162)	-0.674***	(0.109)
self-employed	-0.249	(0.178)	0.166	(0.199)	-0.276**	(0.110)
pensioner	-1.433***	(0.161)	-0.838***	(0.183)	-0.807***	(0.101)
public servant	-1.279***	(0.253)	-0.817**	(0.335)	-0.670***	(0.140)
white collar	-0.513***	(0.136)	0.052	(0.147)	-0.490***	(0.087)
blue collar	0.173	(0.120)	0.346***	(0.128)	-0.059	(0.078)
own dwelling	-0.885***	(0.098)	-0.097	(0.113)	-0.612***	(0.055)
log hh income	0.033	(0.041)	0.051	(0.046)	0.005	(0.026)
log household size	-0.277	(0.171)	-0.409**	(0.189)	0.005	(0.102)
undenominational	-		-		-	
Christian	-0.814***	(0.157)			-0.200***	(0.063)
other religion	0.209	(0.586)			-0.056	(0.204)
interviewer present	0.040	(0.080)	-0.046	(0.091)	0.060	(0.048)
constant	1.851***	(0.615)	-		1.706***	(0.333)
cohort dummy variables	yes		no		yes	
time dummy variables	yes		no		yes	
σ_v					0.46	
σ_u	2.52				2.15	
# observations	40,982		8,580		40,982	
# individuals	9,109		1,780		9,109	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP waves 1998, 1999, 2001, 2002, 2004, 2006

Table 4.7: Estimation results: Smoking, only women

variables	random-effects logit		fixed-effects logit		multilevel model	
country of origin			-			
Germany	-				-	
other EU-countries	0.323	(4.455)			-0.035	(2.138)
Turkey	0.025	(4.482)			-0.063	(2.153)
Eastern Europe	-1.465	(4.435)			-0.198	(2.131)
other countries	-3.168	(4.377)			-1.362	(2.145)
German citizenship	0.568	(0.458)	3.189***	(1.079)	-0.314	(0.238)
language skills						
German very good	-		-		-	
German good/fair	-0.653**	(0.264)	-0.308	(0.306)	-0.453***	(0.157)
German poor/not	-2.021***	(0.475)	-0.746	(0.513)	-1.067***	(0.281)
ysm	0.126*	(0.065)	0.121*	(0.069)	0.054	(0.041)
ysm^2	-0.000	(0.001)	-0.002	(0.001)	0.000	(0.001)
second-generation	0.266	(0.679)	0.649	(1.431)	-0.167	(0.320)
share of foreigners	0.060***	(0.011)	-0.009	(0.020)	0.039***	(0.007)
control variables						
age						
aged 16-25	-		-		-	
aged 26-50	-0.279*	(0.145)	-0.239	(0.149)	-0.241**	(0.094)
aged 51-65	-1.884***	(0.193)	-0.988***	(0.220)	-1.074***	(0.118)
above 66 years	-3.881***	(0.265)	-2.293***	(0.350)	-2.214***	(0.160)
marital status						
married	-		-		-	
widowed	0.026	(0.223)	0.351	(0.395)	0.172	(0.125)
single	1.153***	(0.146)	0.952***	(0.178)	0.488***	(0.083)
divorced	1.272***	(0.159)	0.323*	(0.171)	0.886***	(0.085)
children	0.323***	(0.102)	0.064	(0.110)	0.200***	(0.064)
years of education	-0.264***	(0.026)	-0.006	(0.040)	-0.167***	(0.013)
occupational status						
non-working	-		-		-	
training	-0.239	(0.153)	0.166	(0.155)	-0.237**	(0.103)
self-employed	0.885***	(0.204)	0.977***	(0.241)	0.352***	(0.126)
pensioner	-0.673***	(0.159)	-0.014	(0.187)	-0.497***	(0.101)
public servant	0.174	(0.300)	0.553	(0.398)	-0.017	(0.178)
white collar	0.678***	(0.102)	0.814***	(0.110)	0.203***	(0.065)
blue collar	0.796***	(0.122)	0.685***	(0.130)	0.386***	(0.078)
own dwelling	-0.554***	(0.102)	0.018	(0.123)	-0.464***	(0.058)
log hh income	-0.053	(0.039)	-0.094**	(0.044)	-0.010	(0.025)
log household size	-0.357**	(0.178)	-0.240	(0.199)	-0.151***	(0.109)
undenominational	-		-		-	
Christian	-1.232***	(0.164)			-0.501***	(0.071)
other religion	-1.667***	(0.529)			-0.920***	(0.231)
interviewer present	0.043	(0.083)	-0.073	(0.097)	0.083*	(0.051)
constant	-0.941	(0.661)	-		1.461***	(0.320)
cohort dummy variables	yes		no		yes	
time dummy variables	yes		no		yes	
σ_v					0.34	
σ_u	2.64				2.23	
# observations	44,932		7,577		44,932	
# individuals	9,975		1,569		9,975	

Standard error in parentheses; *** significant at 1%, ** significant at 5%, *significant at 10%
SOEP waves 1998, 1999, 2001, 2002, 2004, 2006

4.6 Conclusion and discussion

This chapter concentrates on the possible contribution of an adaptation of destination-country habits and lifestyles to the decline in immigrants' health over time. The idea is that if health behaviour – considered harmful to health (e. g., smoking, alcohol consumption, poor dietary habits, or physically inactivity) – converges to the level of natives, this might contribute to the deterioration of immigrants' health with duration of residence. Hence, this chapter aims at providing an overview on the health behaviour of immigrants in Germany and especially, it analyses the changes in health behaviour of immigrants with their duration of residence drawing on data from different waves of the SOEP.

For the BMI, data are drawn from three waves of the SOEP (2002, 2004, and 2006). The results show that the BMI increases with additional years in Germany for men and women. Thereby, the idea that changes in lifestyle and environment might lead to a weight gain can be supported. Additionally, it is found that the higher the share of foreigners on the county level, the lower is the BMI in the random-effects models for all samples. This is in accordance with the idea that the higher the concentration of foreigners in a region the less likely immigrants are to adopt their health behaviour, and hence, in the case at hand, the lower is their BMI. Furthermore, having poor German language skills yield a higher BMI for all groups, but the effect is only significant for the total sample and the women sample. This contradicts the idea that the BMI increases with acculturation, as having poor language skills hints towards lower acculturation and hence, on theoretical grounds of the acculturation theory, one would have expected a negative sign.

With regard to the potential influence of an increase in the BMI to the deterioration of immigrants' health with years since migration it can be concluded that a weight gain might indeed contribute to the decline in health. However, more studies are needed to shed light on the complex pattern behind the healthy immigrant effect. Also more accurate data on health behaviour is necessary, for example, on dietary habits (Do they change in Germany and how do they change?) as well as on physical activity. Additionally, professional measured height and weight information would be essential to

control for possible cultural influence on the self-reporting behaviour of height and weight.
Finally, it should be taken in mind that for women it is so far not controlled for pregnancy, which can be regarded as an important influence factor on the BMI.

Data with regard to alcohol consumption are so far only available in one wave (2006) of the SOEP. With regard to the probability of being abstinent, religious affiliation seems to be a very important influence factor with Moslems having a significant higher probability of never drinking any alcohol. The coefficient for years since migration is found to be positive (but not significant) for all subsamples, indicating that the probability of being an abstainer increases with additional years in Germany. This contradicts the acculturation hypothesis. The dummy variable for the second-generation is in all subsamples highly significant and positive. Hence, an individual born in Germany having no German citizenship has a higher probability of being abstinent. This contradicts the acculturation hypothesis, where higher alcohol consumption in the second-generation might have been expected and points towards a new-conservatism of the second-generation. A higher share of foreigners on the county level yield a significantly (with the exception of the women sample) higher probability of never drinking any alcohol. This is in line with the hypothesis that the higher the share of foreigners the less acculturation takes place.
The results have to be interpreted with caution because – as already highlighted – only cross-sectional data are available, which comes along with the difficulty to distinguish between effects over time and changes in cohort quality. Additionally, being abstinent or not is only a crude measure of alcohol consumption and more detailed data on the quantity of consumption is needed.

The data for smoking behaviour are drawn from six waves of the SOEP (1998, 1999, 2001, 2002, 2004, and 2006). Duration of residence is found to have a different influence on the smoking probability for men and women. For men, the coefficient is negative, but not significant. Taking into account, that in many immigrant source countries, the smoking probability is higher than in Germany, this can be interpreted as support for the acculturation hypotheses.

Thereby acculturation comes along with ‘good’ health behaviour, a possibility that has so far been rather neglected in literature. Therefore, in future studies on health behaviour more attention should be drawn on the possibility of a positive change in the health behaviour (at least for smoking). For women, it is found that the probability of smoking increases with additional years of residence in Germany. As smoking prevalence for women is in most of the immigrant source countries smaller than for Germany, this finding can again be interpreted as support for the acculturation hypothesis. However, the higher the share of foreigners the higher is the probability to smoke for women. This finding contradicts the acculturation hypothesis. For men the influence of the share of foreigners on the county level also seems to have no influence.
In the study at hand, only the smoking probability is analysed, but it has been shown that the amount of cigarettes is also of importance. Hence, future studies should take this into account and analyse changes in the quantity of smoking.

Regarding the potential influence of an adaptation of health behaviour to the deterioration of immigrants’ health with years since migration it can be suggested that an increase in the BMI might be a contribution factor. For smoking and alcohol consumption no clear results are found.

Overall, more studies are needed to shed light on the complex pattern behind immigrants’ health behaviour, and especially on the adaptation of health behaviour over time. With the data at hand, only a first approach to immigrants’ health behaviour is possible, and more accurate data on health behaviour (especially on dietary habits) is necessary.

5. Immigrants' access to health care and utilisation of health care services

5.1 Introduction

In this chapter, immigrants' access to health care and utilisation of health care services is analysed. As outlined in chapter 2, access and utilisation of health care are a determinant of immigrants' health and can thus influence the 'healthy immigrant effect' (HIE). However, the contribution or direction of influence of health care services on immigrants' health is rather controversially discussed (see chapter 2 for a discussion) and with the data at hand, it is not possible to gain new insights concerning this contribution. Nevertheless, immigrants' access to and utilisation of health care services is indeed a "blind spot"[38] in Germany, and analysing the factors that determine immigrants' access to health care and their utilisation of health care services might be a first step to gain new insights. An additional motivation for this analysis is the steadily growing amount of literature concerning inequity in access to health care in recent years. However, most of the existing studies that examine inequity in access to health care have focused on income-related inequity (see, among others, Gerdtham 1997; Gerdtham and Trivedi 2000; Hamilton et al. 1997; O'Donnell and Propper 1991; van Doorslaer and Wagstaff 1997; van Doorslaer et al. 1992, 1997, 2000, 2004; Wagstaff and van Doorslaer 2000a; Wagstaff et al. 1991), and little or almost no attention has been paid to inequity with regard to the immigrant population of a country. But, as one of the fundamental goals of the health care system of nearly all OECD countries is to establish 'equal access for equal need', equity should be guaranteed not only independent of income, but also independent of other factors like ethnicity, gender, education, place of residence, and so on.

Hence, the purpose of this chapter is to provide an analysis of the factors determining access to and utilisation of health care services within the immigrant population in Germany. Additionally, this chapter contributes to the

[38] There is a recent publication by Tiesmeyer et al. (2007), which concentrated on the "blind spot" concerning inequities in health care utilisation. However, none of the book chapters was dedicated to inequities in health care utilisation within the immigrant population.

existing debate on equity in access to health care and on equity in health care utilisation by considering whether "equal access for equal need" or "equal utilisation for equal need" has been achieved in the German health care system with regard to the immigrant population.

The selection of possible determinants of health care utilisation relies on the behavioural model of Ronald M. Andersen, whereby the main factors influencing utilisation are categorised into predisposing characteristics, enabling factors, and need (see section 5.2). Analysing the utilisation behaviour of immigrants, it is necessary to control not only for the 'usual' factors such as health status, age, education, marital status, and so on, but also for variables such as language abilities, years since migration, or the share of foreigners on the regional level to control for possible network effects as well as for the possibility to visit doctors who can speak a foreign language. To the best of my knowledge, there is so far no study which takes language skills explicitly into account (see also the discussion on the literature in section 5.4).[39]

Furthermore, it is important to distinguish between the concept of access and the concept of utilisation. Utilisation can directly be observed, whereas access is not directly observable. But to analyse "equal access for equal need", a measure or a proxy of access is needed. A usual way to deal with this problem is to assume a kind of principal-agent framework and to distinguish between a contact and a frequency decision, whereby it is assumed that the first contact is mainly determined by the patient and the frequency decision is mainly determined by the physician. Hence, the contact decision usually serves as a proxy for access and the frequency decision measures utilisation (see section 5.3 for a detailed discussion).

As the number of doctor visits in a given time are analysed, the application of count data models is required. To account for the excess zero problem and for the theoretical principal-agent approach, a hurdle model is estimated (see chapter 5.5). The usage of panel data methods offers the possibility to take

[39] The study of LeClere et al. (1994) included only the language of the interview as an independent variable.

time-constant individual-specific unobserved heterogeneity into account, which allows, for instance, taking into account different behavioural attitudes, health beliefs, preferences, risk aversion, or genetic frailty, which are all likely to influence the utilisation of health care.

The outline of this chapter is as follows. In section 5.2 two models for health care utilisation are discussed, the so-called 'Grossman model' and 'Andersen's structural model of health services use'. Section 5.3 provides a discussion about the principles of equity in health care and the distinction between access and utilisation. A literature review on studies related to immigrants' utilisation behaviour is outlined in section 5.4. The description of the data and the specification of the econometric model can be found in section 5.5. Section 5.6 discusses the empirical findings and section 5.7 concludes.

5.2 Theories of health care utilisation

In the literature on health care utilisation, there are in general two models discussed: The so-called 'Grossman model' and Andersen's behavioural model of health service use. These two models are shortly introduced in the following sections and the reasoning for the choice of the structural model of Andersen is provided.

5.2.1 Grossman model

The Grossman model for the demand of medical care has been presented in the early 1970s by Michael Grossman (see Grossman 1972) and it has become a standard model in the international health economics literature. An important feature of this model is that the demand for medical care is interpreted as a *derived demand* because health care services are not consumed *per se* but they are demanded to maintain or get 'good health'.

In the Grossman model, every individual is assumed to inherit an initial stock of health capital (H_0), which is given exogenously. In any other period, the stock of health is endogenous. That means, the health stock is assumed to

depreciate each period t with the depreciation rate δ_t, which is assumed to increase over time. In contrast, the health capital can be preserved or increased through investments I_t in health (like medical care, time invested in health, diet, or exercises). It is defined that net investment in the stock of health equals gross investment I_t minus depreciation:

$$H_{t+1} - H_t = I_t - \delta_t H_t \qquad (5.1)$$

The depreciation rate was in the initial model assumed to be exogenous, but is can also be modelled endogenous, depending on age, education, or health behaviour. Overall, death is assumed to occur when the stock of health capital falls below a certain threshold level (see Grossman 1972: 225).
The individual is supposed to maximise his/her intertemporal utility function. A higher stock of health capital increases thereby utility in a direct and in an indirect way. It directly enters the utility function as healthy days are a source of utility. It indirectly influences utility as it determines the 'healthy time' that is available for market and non-market activities.

Although the Grossman model is sometimes used in empirical investigations of health care utilisation (e. g., Riphahn et al. 2003), it has been criticised for its empirical firmness. The strongest point of criticism is that according to the theoretical model, the demand for health care services should increase if the individual has an increasing demand for health (meaning a rather good state of health). However, in empirical studies, a higher utilisation is found for a worse state of health (see Breyer et al. 2005: 85ff.; Leu and Gerfin 1992: 72ff.; Wagstaff 1986). One explanation for this fact is that in the theoretical model, the actual state of health is seen as the demanded state of health (see Leu and Gerfin 1992: 76; Thode et al. 2004: 10-11), which can be seen as a rather unrealistic assumption. Additionally, taken the model seriously, it can only be estimated for the employees (see Leu and Gerfin 1992: 71). Finally, the Grossman model has – to the best of my knowledge – not been used in studies with regard to immigrants' utilisation behaviour. This might be due to the fact that there are a range of possible influence factors which have to be taken into account in the analyses of the health care utilisation of immigrants and thus,

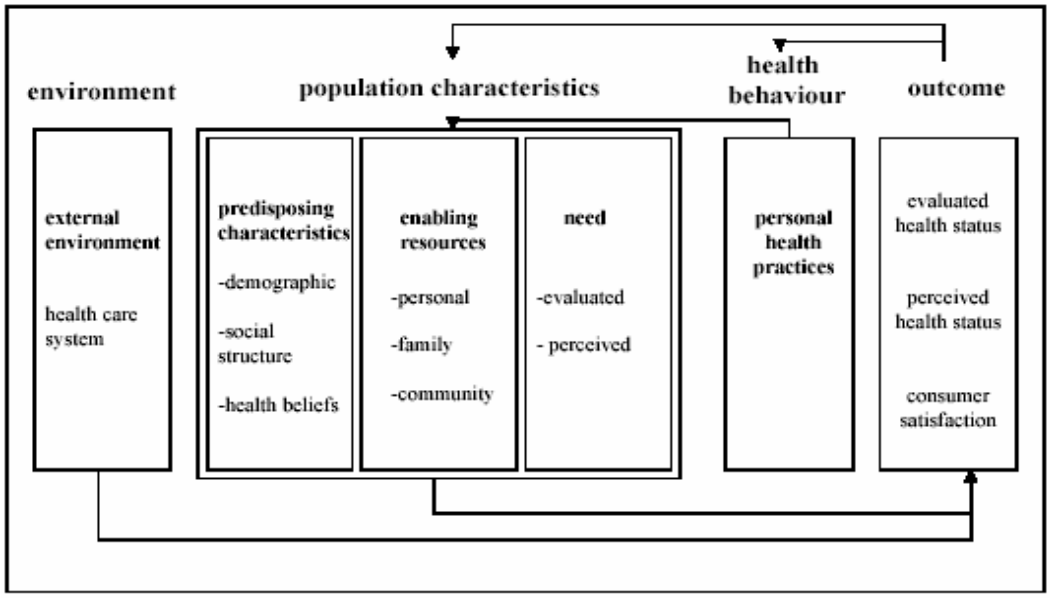
the below described Andersen model might be a more appropriate starting point to structure and identify these possible influence factors. The Andersen model has often been used in literature for the analysis of immigrants' access to and utilisation of health care services (e. g., Deri 2005; Wu and Schimmele 2005). Hence, in this study, the Andersen model is used as reference model, and thus outlined in detail in the following.

5.2.2 Andersen's behavioural model of health service use

Health care utilisation depends on a broad array of different factors. Ronald M. Andersen proposed in the late 1960s the so-called 'Behavioural Model of Health Services Use', which provides a possibility to structure and categorise these different factors. Since the first presentation of the model, it has been modified, revised, and extended several times – by Andersen himself as well as by others (see Aday and Andersen 1974, Andersen 1968, 1995; Andersen and Newman 2005). Today, it has become a standard model in the international health care utilisation research.

The following presents a short outline of the Andersen model and focuses especially on possible extensions regarding the utilisation behaviour of immigrants. A detailed description of the included variables is presented in the empirical part of the paper (see section 5.6).

Figure 5.1: The behavioural model of Andersen



Source: Own compilation according to Andersen 1995

The core of the Andersen model is the categorisation of the so-called **population characteristics** into three groups: Predisposing characteristics, enabling factors, and need.

> "The model suggests an explanatory process or causal ordering where the predisposing factors might be exogenous (especially the demographic or social structure), some enabling resources are necessary but not sufficient conditions for use, and some need must be defined for use to actually take place" (Andersen 1995: 1f.).

Predisposing characteristics

Predisposing characteristics include all factors that influence utilisation in an indirect way. They describe the "propensity" of individuals to use health care services (see Aday and Andersen 1974). Predisposing characteristics can be categorised into demographic variables, social structure, and health beliefs, as well as factors like genetic disposition or psychological factors.

Demographic variables such as age and sex represent "biological imperatives" suggesting the likelihood that people will need health services (see Hulka and Wheat 1985: 446f.). Even though age and sex can hardly be separated from physical circumstances, which influence utilisation, it is also confirmed that

age and sex can influence utilisation in various ways related to social dimensions (see Thode et al. 2004: 26).

Social structure covers all determinants related to

> "the status of a person in the community, his or her ability to cope with presenting problems and commanding resources to deal with these problems, and how healthy or unhealthy the physical environment is likely to be" (Andersen 1995: 2).

Measures include usually variables such as education, social status, occupational status, housing conditions, or social networks. With regard to the immigrant population of a country, also variables like ethnicity or country of origin should be included.

Health beliefs encompass attitudes, values, and knowledge that people have about health and health care services. They influence an individual's perception of need and therefore the individual's decision to seek health care.

> "Health beliefs are not considered to be a direct reason for using services but do result in differences in inclination toward use of health services" (Andersen and Newman 2005: 15).

First empirical approaches in the United States have found that personal beliefs and social networks account for 42% of the variance in the decisions to seek health care, whereby morbidity explained only 12% (see Vickery and Lynch 1995: 553). In literature, it is assumed that with an increasing standard of health service supply for the whole population, subjective indicators are gaining weight (see Andersen and Schwarze 2003: 14f.).

It can be assumed that differences in health beliefs due to cultural and religious influences play a major role in the immigrants' help seeking behaviour and can thus be seen as a key explanation for differences in access (utilisation) (see Szczepura 2005: 144). Unfortunately, the identification of health beliefs is rather difficult due to their subjective character. In addition, health beliefs are very closely related to other factors, which hampers the assessment of their influence (see Andersen and Schwarze 2003: 14).

Enabling resources

Enabling resources are the necessary conditions, which *enable* utilisation. They are divided into community resources and personal or family related resources. First of all, community resources – that means the availability of health care services – are necessary conditions precedent for utilisation to take place. Second, individuals must have the means and know-how to get to the services available. Hence, personal or family related resources include the income[40] and insurance situation of the individual or the family.

With regard to the immigrant population, there might be special problems related to a lack of specific knowledge or information about the structure or organisation of the health care system of the host country, especially if the health care systems of the home and host country are differently organised (for Germany, this has been emphasised by David and Borde 2001 or Grieger 2002). Hence, the 'know-how' about health care services and about how to get them could be an enabling resource, which is of special importance in the group of immigrants.

Additionally, language skills can be seen as enabling resource, because at the one hand, they make it easier to get the necessary information (about the organisation of health care system and so on), and at the other hand, language skills are necessary to communicate with the doctors. Given the possible availability of (foreign) doctors speaking the mother tongue of the immigrants, mother tongue language skills could be an additional enabling resource for which one should control for. Hence, language difficulties – German and mother tongue language skills – might hamper the utilisation of health care services and create additional access barriers.

In addition, the share of other immigrants residing in the same area might be of importance, because one can assume that network or neighbourhood effects might play a role for immigrants' access to and utilisation of health care services (see Deri 2005). Ethnic neighbourhoods or areas with a large number of immigrants can be seen as a source of information and guidance. Hence, a high concentration of immigrants in an area will be beneficial for individuals if others can provide information, for example about the organisation of the

[40] Income can also have an indirect influence on health care utilisation as it might affect health behaviour, exposure to risk, psychological distress, and norms of health care seeking behaviour (see LeClere et al. 1994: 374).

health care system or specific providers. Additionally, networks can even change the demand for health care services when they influence the individuals' perception of health or their health care seeking behaviour, e. g. 'through augmenting the desirability of the available services' (Deri 2005: 1076).

For example, LeClere et al. (1994: 373) remarked that the case of recent immigrants in the United States showed that immigrant groups (Koreans in Los Angeles and Cubans in Miami) benefit from ethnic solidarity and geographic concentration. However, it has also been suggested that the insularity of ethnic enclaves could result in access problems to the best available health care (see Chiswick et al. 2006: 6).

Need

It can be differentiated between the need a person perceives ('perceived need'), and an objective need ('evaluated need'). Most empirical studies rely on perceived need as most of the surveys do not include objective health measures. Differences in need are seen as the most important factors explaining utilisation. As Hulka and Wheat (1985) noted, "need must be accounted for in any serious attempt to explain utilisation" (p.: 445). However, need can only explain part of the variance in the level and distribution of medical services. And this part is – according to experts – surprisingly small (see Breyer 1984: 14 as cited in: Andersen and Schwarze 2003: 10).

External environment

The resources and organisational structure of health care systems can be seen as important external determinants of health care utilisation. These factors are especially important in cross-country studies or in longitudinal studies to assess the effect of health care reforms.

An often included variable in this category is the share of doctors in a specific region to account for supply side effects (see, for example, Andersen and Schwarze 1997).

Additionally, in a region with a high share of immigrants it can be assumed that also more foreign doctors or doctors with migration background are settled. If those doctors can speak the mother tongue of the immigrants and originate from the same cultural background, language and cultural barriers – which might exist by native doctors – can be released and boost utilisation. Deri (2005) provided first evidence that immigrants' health care utilisation increases with an increasing number of doctors in the neighbourhood who can speak their language. Hence, not only with regard to possible network effects as described above, but also with regard to the possibility to go to foreign doctors, the share of foreigners in the immigrants' neighbourhood should be controlled for.

Health behaviour

Personal health practices (such as smoking, dietary habits, alcohol consumption, or sports activities) are also seen as an important influence factor. However, there is no clear evidence so far on how these factors influence help care seeking behaviour. Additionally, only little is known about the health behaviour of immigrants (see chapter 4) and about the interaction between health behaviour and help care seeking behaviour in immigrant populations.

Outcome

The inclusion of outcome adds a dynamic dimension to the model: The state of health is not only a factor that influences the use of medical services, but also an outcome of this usage. The outcomes in turn influence population characteristics and health behaviour, hence there is a "feedback loop" (see Andersen 1995). This simultaneity imposes problems in the estimation process, which ought to be controlled by using information on the lagged health status (see, for example, Schellhorn 2002).

5.3 Principles of equity in health care

Equity focuses on how to distribute resources in a fair and just way. In the field of health care it is usually recognized to be a very important objective; sometimes it is even seen to take precedence over all other objectives, even efficiency (see Wagstaff and van Doorslaer 2000b). Some authors argued that – in spite of the existence of a vast literature on 'equity in health or health care' – there is only little agreement on the exact meaning of this notion (see Oliver and Mossialos 2004). However, as Wagstaff and van Doorslaer (1993) showed, there is a rather broad agreement of policy-makers in several OECD countries about what is meant by equity. Also researchers from quite "different health care systems as Britain and the United States have adopted much the same notion of equity in their analysis" (Wagstaff and van Doorslaer 2000b: 1807), which reflects a rather Marxist or pro-egalitarian view of equity. Hence, there is huge agreement that the distribution of health care should be according to need and payments according to the ability to pay.[41]

Two of the most often applied principles of equity are 'equal access for equal need', and 'equal utilisation for equal need'. Other principles are, for example, equality of expenditure per capita, or equality of health outcome, but they are not discussed here (see Mooney 1983 for a detailed overview and discussion of those principles and Williams and Cookson 2000 for a detailed discussion about equity in health).

Whenever the principle implies that equals are to be treated equally, then it is referred to as "horizontal equity". In contrast, vertical equity implies that unequal individuals are treated differently. Hence, those with unequal needs should have unequal access to health care or individuals with different abilities-to-pay should make unequal contributions to the financing of health care. Empirical literature focuses mainly on the question of horizontal equity, usually in terms of access or utilisation. The question of vertical equity is usually not addressed – as it imposes quite a lot of problems in the empirical application (a notable exception is Sutton 2002).

[41] The great deal of literature on equity and its relation to the theories of social justice cannot be replicated here. For an overview on the philosophical background see, among others, Gillon (1986), Pereira (1993), or Williams (1993), as well as the references therein.

The terms access and utilisation are often used interchangeable. Even though these two concepts are very closely related (especially in their empirical application), one should at least try to distinguish these two terms on a theoretical basis. This is tried to be done in the following.

Definition of access to health care

Access to health care is a complex and multidimensional concept for which there is no uniform definition. Access can be referred to as the availability or the adequate supply of health services. Hence, access is concerned with the opportunity to obtain health care when it is wanted or needed. Mooney (1983) as well as Le Grand (1982) suggested from a health economic perspective that equality of access is achieved if all individuals face the same money and time costs in obtaining care. This approach has been criticised – also by Le Grand (1991) himself – that it is unsatisfactory to say that if two people face the same time and money costs, they are said to have the same access irrespective of their income (see Le Grand 1991).

Pechansky and Thomas (1981) extended the concept of access in considering personal, financial, and organisational barriers to service utilisation. Personal factors include the patients' perception of their needs as well as their attitudes and health beliefs, which can be influenced by social factors. Additionally, as stated above, health beliefs and the perception of need can be both largely influenced by cultural and religious factors. If the health care system does not account for this by supplying a kind of "cultural sensitivity" immigrants can face additional access barriers. Additionally, immigrants may be confronted with access barriers due to missing knowledge about the health care system as well as due to lacking language skills (see LeClere et al. 1994: 372).

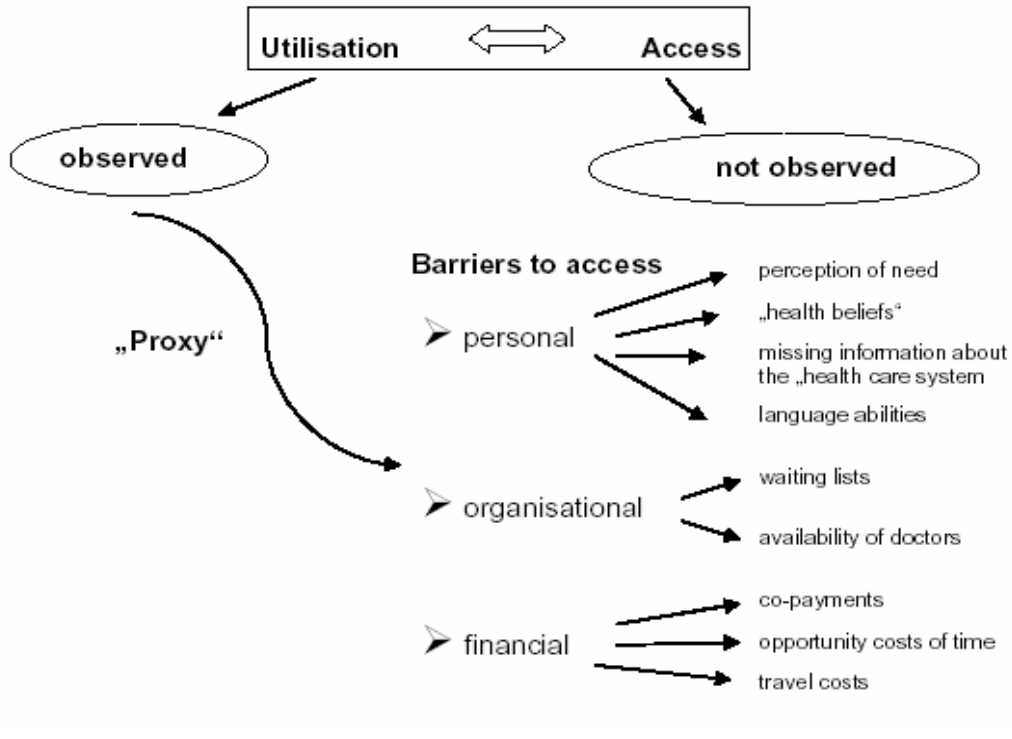
Financial barriers can arise in the presence of out-of-pocket payments. But even in a health care system in which medical care at the point of utilisation is free, individuals may experience financial barriers, for example due to travelling costs or opportunity costs due to time lost from work.

Organisational barriers can result, for example, from long waiting lists or from the unavailability of doctors (see Pechansky and Thomas 1981). Additionally, for example, for illegal immigrants organisational access barriers can arise, if

they do not have the right to enter the health care system by law as in the case of Germany. This point will be neglected here as the data set comprises only legal migrants and no information about illegal migrants is available.

Hence, all variables characterised as enabling factors in the Andersen model could create access barriers and should therefore be of special interest in analysing "equal access for equal need". With regard to the immigrant population it can be assumed that especially personal barriers might play an important role.

Figure 5.2: Relationship between barriers to access in health care and utilisation



Source: Own compilation

Measuring access to health care

As Aday and Andersen (1974) noted in their early contribution: "It is perhaps most meaningful to consider access in terms of whether those who need care get into the system" (ibid: 218). Hence, in this view, the term access can describe either the potential or the actual entry of an individual to the health care system. 'Having access' denotes a potential to utilise a service if required,

whereas ‘gaining access’ refers to the initiation into the process of utilising a service; thus ‘realised access’.

As Mooney (1983) noted, there has been much confusion from these two distinct uses of the term access. He argued – to avoid further confusion – to regard access as only a question of supply. He highlighted that

> “It is important to stress that equality of access is about equal opportunity: the question of whether or not the opportunity is exercised is not relevant to equity defined in terms of access” (Mooney 1983: 182).

Hence, what we expect from a health care system from a normative point of view are equal opportunities: Individuals with equal needs should have equal opportunities, thus equal access, to seek health care. However, this concept of access is rather difficult to implement in empirical studies, because ‘opportunities’ cannot be observed – at least with the data at hand. In this study – and in accordance with the literature (see, for example, Bago d’Uva 2005) – the **contact decision is seen as a proxy for access**. The idea is that in the first step, it is the patient who decides to visit a doctor (‘contact decision’), whereas it is the physician who determines the intensity of the treatment (‘frequency decision’). Hence, access barriers should manifest themselves in the contact decision and therefore, the first contact of a physician is supposed to measure access and the **number of doctor visits** (the frequency decision) **measures utilisation.**

Thereby, both terms are measured purely quantitative. The quality of treatment cannot be regarded here due to data limitations. This might be a severe drawback if the quality of treatment varies between different population groups. For example, assuming that a good treatment depends on the relationship between the doctor and the patient, there might be problems if this relationship is distorted due to language or cultural barriers.

How to measure inequity?

There are two widely applied approaches to measure inequity: The so-called ‘*concentration index approach’* (see, for example, van Doorslaer et al. 1992, 1997, 2000; Wagstaff et al. 1991) and the so-called ‘*multivariate regression*

analysis approach' (see, for example, Gerdtham 1997; Morris et al. 2005).[42] The concentration index is generally used to investigate income-related inequality in health and health care. It can be seen as analogous to the Gini coefficient measuring inequality in the distribution of income (see Morris et al. 2005).

The multivariate regression approach is said to offer more scope than the other approaches for examining the influence of a great variety of possible explanatory variables (see Smaje and Le Grand 1997: 9), which is of importance in the case at hand as lots of factors have been identified to influence access to health care and the utilisation of health care (see chapter 5.2). A drawback of this approach is that it is not possible to quantify the existing inequity (see Wagstaff et al. 1991: 197). However, as this study is – to the best of my knowledge – the first one which explores migration-related inequity in access to health care and health care utilisation, the multivariate regression approach is applied here as a starting point to identify the variables influencing immigrants' access to and utilisation of health care.

In the multivariate regression approach, the underlying idea is to investigate whether need (and demographic variables) are the principal determinants of health care utilisation (see Andersen 1968), which should be the case in an equitable health care system. Hence, a value judgement is needed on which components should explain access and utilisation in an equitable health care system. For example, if income or ethnicity are seen as factors which should not influence the access and utilisation of health care in an equitable health care system, then equity will not be achieved if income and ethnic variables are significant independent predictors of access (the contact decision) or utilisation (the frequency decision).

With regard to the immigrant population it is assumed from a normative point of view, that language skills and years since migration – used as a proxy for

[42] Another approach – and a kind of forerunner of the concentration indices approach – is the so-called 'Le Grand approach'. This approach is not discussed here as it is nowadays generally not applied anymore in literature as it has been criticised for not distinguishing in the analysis between healthy and ill individuals (for a detailed discussion and applications, see, among others, Collins and Klein 1980; Le Grand 1978, 1982; O'Donnell and Propper 1991; Smaje and Le Grand 1997; Wagstaff et al. 1991).

know-how of the health care system – should not be independent predictors of access and utilisation. However, differences in access to or in the utilisation of health care according to the country of origin can also arise due to behavioural aspects, and thus due to differences in preferences and risk aversion, and are thus not regarded here as inequity here.

Hence, it is defined that migration-related inequity in access (utilisation) will exist if

- language skills and / or
- years since migration

are significant predictors of the contact decision (frequency decision).

5.4 Literature review

For Germany, there are only very few studies dedicated to the utilisation behaviour of immigrants. Thereby, most of the studies usually focus only on a specific subgroup of immigrants (e. g., Borde 2002 or David and Borde 2001 for Turkish women), on a specific health problem (e. g., Borde 2002 or David and Borde 2001 for gynaecological diseases), or on a specific health care sector (e. g., Borde et al. 2003 and Braun 2004 for the visits of emergency ambulances). Although those studies can reveal important insights into the utilisation patterns of immigrants and help to understand help-seeking behaviour, they suffer from one important drawback, namely that only those immigrants searching for care are sampled and nothing is known about the group who is not entering the health care system. However, comprehensive studies using population surveys are – to the best of my knowledge – so far not available for Germany (see also chapter 1.4 for a discussion of possible data sources in Germany).

In the international literature, there are lots of studies analysing immigrants' access to or utilisation of health care services by just including one or several dummy variables for the country of origin or immigrant status (e. g., Birch et al. 1993; Globerman 1998; Newbold 2005b; Smaje and Le Grand 1997; Stronks et al. 2001; Wu and Schimmele 2005). In these studies it is not

possible to identify if a significant effect of the country of origin or of immigrant status is due to cultural differences or preferences in the use of health care services or due to additional access barriers caused by factors like a lack of language skills or a lack of knowledge about the health care system. Hence, these studies are not reviewed here.
The following highlights those few studies, which include language skills or other important migration-related factors.

For the United States, LeClere et al. (1994) used the 1990 National Health Interview Survey supplement on Family Resources to examine health utilisation patterns across immigrants and native-born in the United States. They found a significant effect of the language proficiency (measured by the interview language) and years since migration: Recently arrived immigrants are found to be 2-3% less likely than native borns to have visited the doctor in the last twelve month (ibid: 380). With a higher duration of residence this effect was found to decrease and for immigrants with more than 15 years in the United States, no statistically difference in comparison to natives has been found. As the conclusion is drawn from cross-sectional data, one has to be cautious as the effect might be influenced by a change in the cohort quality over time as LeClere et al. (1994: 379) remarked themselves. A lack of English skills was found to reduce the probability of a doctor visit by 1%. They concluded that language is a primary barrier to health care that immigrants have to face.

For Canada, Laroche (2000) used two cycles of the General Social Survey to analyse the utilisation behaviour of immigrants. She included ‘mother tongue’ (distinguishing between ‘English’, ‘French’, or ‘other’) as an additional explanatory variable (besides controls for socio-economic characteristics, health behaviour, and country of origin). Laroche concluded that immigrants and non-immigrants use health care services in a similar manner (ibid: 61). For mother tongue she found that the effect varied with the measure of health care utilisation, but overall she concluded that mother tongue has no influence on health care utilisation (ibid: 64).

The study of Deri (2005) is the first one, which analysed the influence of networks on immigrants' health care utilisation. Using data from three cycles of the Canadian National Population Health Survey (NPHS), the Canadian Census, and the Canadian Medical Directory, she found strong and robust evidence of network effects for the contact decision in a way that the behaviour of an individual is affected by the behaviour of individuals around her/him. The influence on access is thereby found to be ambiguous: For individuals living in an area with high utilisation of the language group, access to health care is increased. However, living in an area with a low utilisation of the language group decreases access to health care (ibid: 1090). Additionally, she found that the utilisation of immigrants' health care services increases with a higher number of doctors in their neighbourhood speaking their language.

5.5 Data and econometric method

5.5.1 Data

The data used are drawn from eleven waves (1995 to 2005) of the SOEP (see chapter 1.4 for a detailed description of the SOEP). As remarked in chapter 4, the SOEP contains additionally the information in which region the household is living, which offers the possibility to merge regional macro-indicators provided by the 'Federal Office for Building and Regional Planning' (*Bundesamt für Bauwesen und Raumordnung*, BBR). In this chapter, the share of foreigners and the share of doctors on the county level are merged to the SOEP data.[43]

The counties in Germany differ largely according to the share of foreigners as well as according to the number of doctors per 100,000 inhabitants. As noted in chapter 4, in 2005, the highest share of foreigners can be found in Offenbach (26.2%), Munich (24%), Stuttgart (23.7%), and Mannheim (22.0%), the lowest share of foreigners can be found in Sömmerda (0.7%), Saalkreis (0.9%), and Annaberg (1.0%). In general, the share of foreigners is rather high

[43] According to data protection rules, this part of the research using regional information was carried out at the DIW Berlin. I thank the staff for making the information available.

in west German urban areas and rather low in the east of Germany. A regional overview on the distribution of foreigners in Germany can be found in figure A1 in the appendix. Regarding the number of doctors per 100,000 inhabitants, in 2005, the highest proportion can be found in Bamberg city (335), Regensburg (321), Rosenheim (312), and Munich (312), the lowest proportion can be found in Saalkreis (69), Bamberg county (86), and Bayreuth county (86).

5.5.2 Empirical specification: Count data models

In many empirical studies of health service utilisation the variable which is mainly ought to be explained is a count variable (e. g., number of physician visits (sometimes detailed by type of physician), number of hospital stays or nights in hospital, or the number of drug prescriptions). Counts are discrete variables that can only take non-negative integer values, which makes the application of count data models appropriate.

Estimates of the utilisation of health care services are known to depend heavily on the empirical specification used in the analysis, and only minor changes in the study design can lead to significant changes in the estimation results (see Andersen and Schwarze 1997; Deb and Holmes 2000: 475). This highlights the importance to be cautious with the interpretation of estimation results, the choice of the empirical methods as well as with the choice of the included variables.

Poisson regression model

The **Poisson regression model** (PRM) is the basic and fundamental count data model on which other count data models are based on and which usually serves as a standard benchmark model. The events being counted can be seen as the outcomes of n independent Bernoulli trials in a given period. It can be shown that the probability distribution of the number of occurrences in n trials approaches the Poisson distribution with expected value λ as n goes to infinity. To obtain a regression model, each observation is allowed to have a different

value of λ, dependent on a set of independent variables x. Hence, the intensity parameter λ_i is specified as a function of observed independent variables x_i's.
A positive value of λ is conveniently ensured by specifying λ as a log-linear function of the explanatory variables x_i, and the following conditional probability distribution is obtained:

$$f(y_i) = \frac{\exp(-\exp(x'_i\ ß))\exp(x'_i\ ß)^{yi}}{y_i!}, \qquad y_i = 0, 1, 2,\ldots \qquad (5.2)$$

where x is a vector of K explanatory variables including a constant and ß denotes the corresponding coefficient vector.

It is then:

$$E(y_i|x_i) = \exp(x'_i ß) = \lambda(x_i;ß) \qquad (5.3)$$

which is called the exponential mean function.

The equality of mean and variance – the so-called *equidispersion* – is a main characteristic of the Poisson distribution. If equidispersion does not hold it can be due to either *overdispersion* (variance is greater than the mean) or *underdispersion* (variance is smaller than the mean) (see, for example, Cameron and Trivedi 1998 for a detailed discussion).
This *equidispersion assumption* is usually taken as one of the major shortcomings of the PRM (see Greene 2003: 744). Violation of equidispersion will – as long as the conditional mean is correctly specified – not lead to biased parameter estimates, but it will cause the estimated standard errors to be biased (in the case of overdispersion downwards, in the case of underdispersion upwards), and thus rule out inference (see Cameron and Trivedi 1998; Greene 2003).
Overdispersion can be caused by at least one of the following three problems:
Firstly, due to the deterministic relationship $\lambda(x_i;ß) = \exp(x'_i ß)$ it is not possible in the PRM to allow for *unobservable individual heterogeneity*. One of the consequences of unobserved heterogeneity is overdispersion (see Skrondal and Rabe-Hesketh 2004: 10). Secondly, many data sets used for count data modelling are characterised by a large proportion of zero users.

However, as λ increases, the probability of a zero count decreases. Hence, the PRM will mostly predict much fewer zeros than there are in the data. This problem is called the "*excess zero*" or "*zero inflation*" problem (see Winkelmann 2000). Thirdly, another critical assumption of the PRM lies in the postulated *independence of the events over time*. That means, the PRM is only correctly specified if the probability of an occurrence in t does not depend on the occurrence in t-1. Therefore, in the case at hand, a doctor visit in t should not have any influence on subsequent doctor visits. This might be an unrealistic assumption if an illness spell leads to several doctor visits which are not independent from one another. Hence, if events do not occur randomly over time, the application of PRM renders inappropriate.

Negative Binomial Model

An alternative to the PRM is the **Negative Binomial Model** (negbin), which builds upon the negative binomial distribution. This is a more flexible distribution than the Poisson, because it allows a more flexible modelling of the variance. It is seen as the standard parametric model to account for overdispersion (see Cameron and Trivedi 1998: 71). However, as Gurmu (1997: 237) noted "although the Negbin model is superior to the Poisson in that it allows for overdispersion, it is inadequate in various practical situation". He remarked that the model leads to poor fits in data with a large proportion of zeros and a long-tailed distribution (ibid: 237). This is a common issue in health care utilisation data, where there is typically a large proportion of zero users and a small proportion of heavy users (see Jones et al. 2007: 279). Additionally, the Negbin model as well as the PRM assumes that there is only one underlying process that generates the zero and positive observations. This assumption has been shown to be too restrictive in the case of health care utilisation (see Jones et al. 2007: 286).

The Negbin model is shortly outlined here as it is of importance for the below described and applied zero-truncated negative binomial (ztnb) model. For a detailed description, discussion and derivation of the model see, among others,

Cameron and Trivedi 1998 or Hilbe 2007. The outline is mainly based on Jones et al. (2007: 283f.).

As explained above, the Poisson model fails to account for unobserved heterogeneity, which yield overdispersion and excess zeros. To derive the Negbin model, unobserved heterogeneity is modelled as a mixture:

$$\exp(x_i ß + \mu_i) = [\exp(x_i ß)]\eta_i \quad (5.4)$$

whereby $E(\eta_i) = 1$ and η_i is a random term for which its distribution has to be defined. In the Poisson model, $(y_i|x_i)$ follows a Poisson distribution. In contrast, in the mixture model, it is assumed that $(y_i|x_{i,}\eta_i)$ follows a Poisson distribution. The marginal distribution of $(y_i|x_i)$ is obtained by defining the distribution for η_i. To derive the Negbin model as a Poisson mixture, η_i is assumed to follow a gamma distribution.
The probability to observe count y_i is then:

$$P(y_i) = \{\Gamma(y_i + \Psi_i)/\Gamma(\Psi_i)\Gamma(y_i + 1)\}(\Psi_i/(\lambda_i + \Psi_i))^{\Psi i}(\lambda_i/(\lambda_i + \Psi)_i)^{yi} \quad (5.5)$$

whereby $\Gamma(.)$ is the gamma distribution.

It is:

$$\Psi = (1/\alpha)\lambda^k \quad (5.6)$$

whereby α is an additional parameter. For $\alpha > 0$, it is:

$$E(y) = \lambda \text{ and } Var(y) = \lambda + \alpha\lambda^{2-k}$$

Hence, when $\alpha = 0$, the Poisson model is obtained.

Generally, it is assumed that k = 1 (whereby the variance is then proportional to the mean) or k = 0 (whereby the variance is a quadratic function of the mean). By default, Stata estimates k = 0.

The so far described "one-step" or "single equation" models take a rather traditional consumer theory approach (e. g., Grossman 1972; Muurinen 1982), where the demand for health care services is seen as primarily patient determined (see Deb and Trivedi 1997: 313). However, as proposed by Zweifel (1982), the decision to contact a physician at all and the actual number of visits can be seen as the result of two separate decision-making processes. This principal-agent approach is quite often highlighted in the literature: The idea behind is that in a first step, it is the patient who decides to visit a doctor (contact decision), whereas it is the physician who determines the intensity of the treatment (frequency or intensity decision) (see, among others, Gerdtham 1997: 308; Manning et al. 1987: 109; Pohlmeier and Ulrich 1995: 340). It is thereby assumed that the (individual's) decision to contact a physician is generated separately from the (physician's) decision on successive utilisation of health services.

Hence, models where the different nature of the zeros and the positive counts is taken into account have to be considered, namely the zero-inflated models and especially, the so-called hurdle models (see Jones et al. 2007: 286).

Zero-inflated models

Lambert (1992) introduced the **zero-inflated Poisson** (ZIP) and the **zero-inflated negative binomial models** (ZINB). These models allow the zeros to be generated by two distinct processes. The classical example is the number of fishes caught in a given lake. Some of the "zeros" result from fishing and not catching; but some also result from not fishing at all. Hence, the underlying assumption is that the population is characterised by two regimes: One group where the members have always zero counts and one group where the members have zero or positive counts. In the case of health care utilisation data, Jiménez-Martin et al. (2002) stated that the zero-inflated models are

> "not reasonable since we know that a patient decides to contact a physician just when he makes a visit. Therefore, the count for those that decide to visit a physician in the first stage is always at least one" (ibid: 305).

Hence, these models are not outlined here. For a discussion and application of ZIP and ZINB, see, for example, Jones et al. (2007: 286ff.).

Hurdle models

So-called '**Hurdle models'** assume that the dependent variable is generated by two separate decision-making processes. Thereby, the first part is assumed to model the decision to seek care, which is mainly made by the patient (so-called 'contact decision'). The second part models the positive counts for those individuals that established the contact. It is thereby assumed that the physician determines the frequency of visits as he/she acts as the agent for the patient (the principal) once the first contact has been established by the patient (so-called 'frequency decision').

The hurdle model has been used quite often in the international literature and it has been demonstrated – for instance by Andersen and Schwarze (1997), Gerdtham (1997), Grootendorst (1995), or Pohlmeier and Ulrich (1995) – that it might be a better option to estimate two-part models instead of one-part models if the dependent variable is characterised by a large proportion of zeros and if the dependent variable results from two separate decision-making processes.

The hurdle model has first been proposed by Mullahy (1986):

> "The idea underlying the hurdle formulations is that a binomial probability model governs the binary outcome of whether a count variate has a zero or a positive realization. If the realization is positive, the "hurdle" is crossed, and the conditional distribution of the positives is governed by a truncated-at-zero count data model." (ibid: 345).

As the two parts are assumed to be independent and generated by two different processes, it is possible to estimate the two parts of the hurdle model separately. The independent variables can be different for each of the two processes, or they can be the same, but may be interpreted differently depending on the stage of the decision-making process. For instance, the variable 'physician density' represents at the first stage an availability effect, whereas at the second stage it may reflect competition among physicians, and

thus supplier-induced demand (see Jürges 2007; Pohlmeier and Ulrich 1995: 344).

Modelling the contact decision

A **binary model** has to be defined for the **participation or contact decision**. The underlying distribution is usually either logit, probit, or Poisson. In the case at hand, a random-effects probit model is estimated, which allows to control for individual-specific unobserved heterogeneity (see Baltagi 2001; Greene 2003 and chapter 3.4.7 for a detailed discussion of the model). In chapter 3.4.7 a random-effects logit model was outlined in detail. The only difference between the logit and probit specification lies in the underlying distribution of the error term: Whereas in the logit specification, it is assumed that the error term is distributed logistically, in the probit specification the error term is assumed to be distributed normally.

Modelling the frequency decision

For the **frequency decision,** a truncated-at-zero count data model has to be defined, whereby the underlying distribution is commonly either Poisson or negbin. In the case at hand, a **zero-truncated negative binomial model** (ztnb) is estimated.

The special feature of the ztnb model lies in the structurally exclusion of zero counts. Hence, in the case at hand, the model is only estimated for those individuals who accessed the health care system.

As Hilbe (2007) noted:

> "The Poisson and the negative binomial distribution both include zeros. When data structurally exclude zero counts, then the underlying probability distribution must preclude this outcome to properly model the data. This is not to say that Poisson and negative binomial models are not commonly used to model such data, the point is that they should not. The Poisson and the negative binomial model, and their respective log-likelihood functions, need to be amended to exclude zeros, and at the same time provide for all probabilities in the distribution to sum to one" (p.: 160).

The following outline of the zero-truncated negative binomial model is based on Hilbe (2007: 160ff.), where also a detailed discussion and derivation with several applications is provided.

Assuming that the probability of a zero count is:

$$\left(1+\alpha\lambda_i\right)^{-1/\alpha} \tag{5.7}$$

The resulting log-likelihood function is:

$$LL_{ztNB} = \left(\lambda; y_i \mid y_i > 0\right) = \sum_{i=1}^{n}\left\{LL_{NB} - \ln\left[1-\left\{1+\exp\left(x_i\beta\right)\right\}^{-1/\alpha}\right]\right\} \tag{5.8}$$

whereby LL_{NB} is the log-likelihood of the Negbin model (see 5.5).

The ztnb model is implemented in Stata and can be estimated using the command ‘ztnb’.

A common criticism of the hurdle model is the sharp distinction between users and non-users, which is said to be usually not tenable in the case of typical survey data sets, because medical consultations are measured per period of time and not per illness episode (see, for example, Deb and Trivedi 2002: 602; Gerdtham and Trivedi 2000). Hence, Gerdtham and Trivedi (2000) questioned the possibility to make a direct link between the hurdle and the principal-agent framework. To overcome the sharp distinction between users and non-users, Deb and Holmes (2000) and Deb and Trivedi (1997, 2002) proposed the use of **finite mixture or latent class models** (LC) as an alternative to hurdle models, whereby it is discriminated between frequent and less frequent users.

For the sake of completeness, the following provides a short discussion of the literature with regard to the advantages and disadvantages of hurdle models in comparison to LC models. Nevertheless, in the case at hand, the hurdle model is used as described above as it provides the possibility to apply the principal-

agent framework, and thus to explicitly model the contact and the frequency decision. A possibility to measure access and to distinguish between access and utilisation is essential for the study at hand as it is the only possibility to identify barriers to access as well as to identify the role of language skills and years since migration for access and utilisation, respectively.

According to Deb and Trivedi (1997) there are a number of advantages of the LC model or finite mixture approach. Firstly, it provides a "natural representation of heterogeneity", because each latent class can be seen as a "type" of individual and additionally, the choice of the functional density form can accommodate heterogeneity within each component. Secondly, as the finite mixture model is semi-parametric, the underlying distribution for the mixing variable does not need to be specified. Thirdly, as has been shown by Heckman and Singer (1984), finite mixture models provide good numerical approximations of the estimates even if the underlying mixing distribution is continuous. Fourthly, it is also possible to estimate finite mixture models if the marginal density has no closed form (see Deb and Trivedi 1997: 318). Finally, the latent classes are assumed to be based on a person's long-term health status, which is a latent variable and usually not observable (see Cameron and Trivedi 1998).
Although Jiménez-Martin et al. (2002: 306) listed the same advantages of finite mixture models, they also mentioned some disadvantages. Firstly, they mentioned that they are only driven by statistical reasoning, whereas the hurdle model can be seen as a natural extension of the principal-agent model. Secondly, according to Jiménez-Martin et al. (2002: 306), the finite mixture model is sometimes difficult to estimate, because the mixing distribution has to be estimated jointly with the rest of the model parameters, which can yield over-parameterisation. Finally, they added that misspecification of the density is as possible as in the hurdle model.

The hurdle model and the latent class model are closely related; however they are not nested. Therefore, it is a priori not clear, which model will empirically perform better. Hence, there is a growing number of studies comparing the performance of the hurdle model and the latent class model (see, among others,

Deb and Trivedi 1997, Jiménez-Martin et al. 2002, Santos-Silva and Windmeijer 2001, Van Ourti 2004; Winkelmann 2004). For example, Winkelmann (2004), who compared a range of models, including the Hurdle negative binomial, the Hurdle probit-Poisson-log-normal, and several finite mixture models, found that his proposed Hurdle probit-Poisson-log-normal model is preferred overall by statistical model selection criteria (for example, log likelihood, Schwartz Information Criterion, or Vuong's test). Hence, he concluded that the results of Deb and Trivedi (2002) can only be "interpreted as evidence against the particular hurdle parameterization, but not against hurdle models in general" (p.: 467).

5.5.3 Design of the sample

As described in chapter 1, the SOEP gives information on the immigrant's country of origin and on nationality, which is of importance to distinguish between first- and second-generation immigrants. The following descriptive analysis and empirical analyses are conducted separately for first- and second-generation immigrants. Thereby, the first-generation is defined as being born abroad, irrespective of nationality. The group of ethnic Germans is therefore included in this group. The second-generation is defined as being born in Germany and either have no German nationality or having German nationality, but not since birth.[44] Overall, all individuals above the age of 16 are included in the sample.

The first- and the second-generation is analysed separately, because one can assume that German language skills and mother tongue language skills are differently distributed in these groups. First-generation immigrants should have a high proficiency in their mother tongue and maybe more difficulties in German. For the second-generation the language skills should be distributed the other way round (see also chapter 5.5.6 for a descriptive analysis). Hence, combining the first- and the second-generation might cancel out the effect of language skills. Additionally, the cultural perception of health or the health care seeking behaviour might vary between the first- and the second-

[44] The question with regard to 'German nationality since birth' has only been introduced in 2003.

generation as the second-generation is assumed to be more influenced by the German culture through, for example, schooling.

5.5.4 Dependent variable

In the SOEP, there are two questions with regard to the utilisation of health services: One relating to inpatient and one to outpatient services. However, this study concentrates only on doctor visits and hospital stays are not analysed. Unfortunately, only in five waves (1984-1987 and 1994) it has been asked separately for the use of general practitioners and specialists. Hence, the general question is used, which has been asked in all the other waves:

> *"Have you gone to a doctor within the last three months? If yes, please state how often".*

This is a rather gross measure of health care utilisation and can therefore be criticised. A better alternative would be specific measures related to a particular condition or the type of services or practitioners. Nevertheless, general doctor visits are widely used in empirical studies and can serve to provide first insights to inequity in access to or inequity in the utilisation of health care services.

Table 5.1 gives an overview of the number of doctor visits for the first-generation and for the second-generation, and for men and women, respectively. The dependent variable is highly skewed to zero. The variance exceeds in all cases the mean; hence there is evidence for overdispersion. For all groups, women show higher utilisation rates than men. Especially, second-generation women have about two times the mean of second-generation men. Second-generation men show the lowest mean of the number of doctor visits (1.24), and first-generation women the highest (2.83).

Table 5.1: Doctor visits: Descriptive analysis

number of doctor visits	first-generation		second-generation	
	men	women	men	women
0	0.41	0.29	0.53	0.34
1-2	0.30	0.33	0.31	0.31
3-6	0.20	0.28	0.14	0.27
7-10	0.05	0.06	0.02	0.05
>10	0.04	0.04	0.01	0.03
mean	2.42	2.83	1.24	2.49
std. deviation	4.67	4.40	3.13	4.13
n	10,065	9,692	1,610	1,596

Note: Share of total observations in percent; not controlled for other characteristics like age or health
Source: Own computation, SOEP, waves 1995-2005, not weighted

5.5.5 Independent variables

The inclusion of the independent variables is guided by the behavioural model of Andersen (see section 5.2) and the following explanatory variables are included: A dummy variable for ***sex*** (taking the value one for males); three dummy variables for ***age*** (one for the age category 26-50 years, one for the age category 51-65 years, and one that takes the value one if the respondent is older than 66, with the age of 16-25 years acting as reference group); dummy variables for the ***country of origin*** (i. e., a dummy variable for being born in European countries, a dummy variable for those born in Turkey, a dummy for being born in Eastern European countries, and a dummy for being born in all other countries); a dummy variables for the ***marital status*** (i. e., taking the value one for being married, with being single, widowed, or separated acting as reference group); a dummy variable for having ***children*** (aged 0-4 years); ***years of education***; ***occupational status*** (i. e., dummy variables covering the following possibilities: 'blue collar worker', 'white collar worker', 'training', 'self-employed', 'pensioner, or 'public servant' (with 'non-working' or 'jobless' acting as reference group); logarithm of ***post-governmental***

household income, logarithm of ***size of the household***;[45] a dummy variable indicating if the person has ***health insurance*** (taking the value one for having no insurance, and zero otherwise); a dummy variable for ***German citizenship***; four dummy variables for ***lagged self-rated health*** ("good", "fair", "poor", or "very poor" with "very good" acting as reference group); a dummy variable indicating if the individual has been officially registered as having a reduced capacity for work or ***being severely disabled***; two dummy variables for ***German language skills***[46] ("good/fair", "poor/not at all" with "very good" acting as reference group); ***mother tongue language skills***[47] ("good/fair", "poor/not at all" with "very good" acting as reference group); ***years since migration***; ***ysm²***; ***number of doctors*** per 100,000 inhabitants according to the county level, the ***share of foreigners*** according to the county level, and a set of time dummy variables (one dummy variable for each year).

Health behaviour (smoking, body mass index, sports activities) cannot be included in the analysis as these variables have only been asked in three waves up to now.

Another important variable for women is pregnancy. It can be assumed that doctor visits and pregnancy are correlated with higher numbers of doctor visits for pregnant women. However, in the SOEP, the information if a woman has been pregnant at the time of the interview is only available from wave 2002 onwards. Hence, this information cannot be included in the estimation.

5.5.6 Descriptive characteristics of the sample

Table 5.2 presents descriptive characteristics of the sample. In the first-generation, there are slightly more men than women in the sample (51% to 49%). In the second-generation the proportion between men and women is equal. The second-generation immigrants are with an average age of 28.3 for men and 28.2 for women about 16.9 (15.6) years younger on average than

[45] Schwarze (2003) showed that the inclusion of logarithm of household income and logarithm of household size is more flexible, because it is not necessary to make any assumptions about the equivalence scale.

[46] These are constructed from a self-assessed question: "In your opinion, how well do you speak German?"

[47] Mother tongue language skills are also constructed from a self-assessed question: "In your opinion, how well do you speak your native language?"

first-generation men (women). Regarding the marital status, the first-generation immigrants are the group with the highest proportion of married individuals with around 80%, compared to between 31% (men) and 42% (women) for the second-generation. The low proportion of marriages in the second-generation might be explained by their lower average age. The proportion of individuals having young children is nearly the same in the first- and second-generation, namely between 17% and 23%. Regarding years of education, male first-generation immigrants have on average 10.3 years of education, female first-generation immigrants 10.0 years, and the second-generation about 10.8 years. Concerning occupational status, there is a great difference between men and women immigrants, reflecting more traditionally labour market roles, whereby women do not participate in the labour market: Whereas between 12% (second-generation) and 15% (first-generation) of male immigrants report to be either non-working or jobless, this ratio amounts to 39% (first-generation) and 31% (second-generation) for women. Remarkable is further the relative great part of women working in white collar jobs. Only 9% (25%) of first-generation men (second-generation men) are white-collar workers, but 16% (31%) of first-generation women (second-generation women). There are almost no public servants in the sample, which might be due to law restraints. About 24% (men) and 21% (women) of the second-generation are in training, compared to only 4% for the first-generation. This can be explained by the younger average age of the second-generation sample. Additionally, in the second-generation there are almost no pensioners, whereas the proportion is between 16% (men) and 12% (women) in the first-generation. This is again due to the younger sample age of the second-generation immigrants. The proportion of individuals with no health insurance is very small and lies below one percent. In all groups, men rate their health on average better than do women. In the second-generation, 80% of men and 71% of women rate their health as very good or good. This very high proportion in comparison to first-generation immigrants (55% for men and 49% for women) can – at least to a great part – be explained by the younger average age of the second-generation. In the group of first-generation men 11% state to have a reduced capacity to work or to be severely disabled, for women the ratio is only 6%. In the second-generation the ratio lies between 3% (men) and 4%

(women). About one third of first-generation immigrants have German nationality, and most of them are ethnic Germans. There are only very few immigrants (about 3%) from countries other than European (about 28%) or Eastern countries (about 40%), or Turkey (about 29%). In the second-generation, the distribution of nationality is different, with more than 40% having nationality from another EU-country, and only about 15% having nationality from an Eastern European country. This might be due to the fact, that children from ethnic Germans get German nationality by birth and can thus be not identified here as second-generation. Regarding German language skills, there is a huge difference between first- and second-generation immigrants. Whereas in the first-generation 62% of the men and 58% of the women rate their language skills as very good or good, the ratio in the second-generation amounts to 98% for men and 93% for women. The ratio of second-generation men assessing their language skills as poor or very poor is below one percent; and for women only 2%. This should be taken in mind regarding the interpretation of the estimation results. Regarding mother language skills, about 91% of first-generation immigrants report to speak either very good or good. In the second-generation, 70% of the men and 77% of women rate their skills as very good or good. Again, there is only a very small percentage in the sample which rates their skills as poor or very poor (3% in the first-generation and about 9% in the second-generation). Again, this should be taken into account in the interpretation of the estimation results. The average duration of residence in Germany is rather high, with an average of 21.3 years for first-generation men and 19.2 years for first-generation women.

Table 5.2: Descriptive characteristics of the sample

Variable	first-generation		second-generation	
	men	women	men	women
sex	0.51	0.49	0.50	0.50
age (in years)	45.2 (14.3)	43.8 (13.9)	28.3 (10.88)	28.2 (10.36)
married	0.80	0.79	0.31	0.42
children young (0-4)	0.17	0.18	0.19	0.23
years of education (in years)	10.3 (2.2)	10.0 (2.5)	10.9 (2.4)	10.8 (2.2)
occupational status				
jobless / not working	0.15	0.39	0.12	0.31
blue collar	0.52	0.27	0.33	0.13
white collar	0.09	0.16	0.25	0.31
pensioner	0.16	0.12	0.03	0.02
public servant	0.00	0.00	0.01	0.00
training	0.04	0.04	0.24	0.21
self-employed	0.05	0.02	0.05	0.02
household income	29506.2 (15684.4)	28300.4 (15575.1)	31138.0 (13774.2)	28305.7 (14822.9)
size of household	3.5 (1.6)	3.4 (1.6)	3.4 (1.6)	3.3 (1.6)
no health insurance	0.01	0.01	0.01	0.01
lagged self-rated health				
very good	0.12	0.08	0.30	0.22
good	0.43	0.41	0.50	0.49
fair	0.28	0.30	0.15	0.20
poor	0.14	0.16	0.04	0.07
very poor	0.04	0.04	0.01	0.02
disability	0.11	0.06	0.03	0.04
German nationality	0.30	0.33	0.09	0.09
country of origin[a]				
other EU-countries	0.28	0.25	0.46	0.43
Turkey	0.29	0.26	0.30	0.28
Eastern Europe	0.40	0.46	0.15	0.19
other countries	0.03	0.04	0.01	0.02
German language skills				
very good	0.23	0.23	0.66	0.72
good	0.39	0.35	0.32	0.21
fair	0.29	0.27	0.02	0.04
poor	0.09	0.13	0.01	0.01
very poor	0.01	0.02	-	0.01
mother tongue				
very good	0.52	0.53	0.27	0.32
good	0.39	0.37	0.43	0.45
fair	0.06	0.07	0.20	0.16
poor	0.02	0.02	0.06	0.06
very poor	0.01	0.01	0.03	0.02
years since migration	21.3 (10.6)	19.2 (10.2)	-	-
# observations	10,065	9,692	1,610	1,596

Note: Standard deviation in parentheses
[a] for the second-generation the values refer to nationality
Source: SOEP, waves 1995-2005, not weighted

5.6 Estimation results

5.6.1 Estimation results for the contact decision

The results for first-generation immigrants with regard to the first part of the hurdle model, namely the random-effects probit model, are presented in table 5.3. The estimation is conducted for the total sample (column 2) and for men and women separately (column 3 and column 4) to allow for a possible different influence of certain independent variables on health care utilisation of men and women, respectively. Overall, the results are in line with the existing literature on health care utilisation.

In this chapter, I restrict the interpretation of the coefficients to a qualitative approach, with a positive sign indicating a higher probability of visiting the doctor, and a negative sign indicating a decreasing probability.

Being born in Turkey has no significant influence on the probability of a doctor visit compared to those born in a European country. For women, the coefficient of 'born in Turkey' is positive, though not significant, which is a rather unexpected finding as it is often assumed that especially Turkish women suffer from cultural barriers to health care. In contrast, being born in Eastern Europe and in 'other countries' lowers the probability of a doctor contact significantly (in the total sample). Explanations for that finding can be twofold: On the one hand, it could reflect cultural barriers to access to health care. On the other hand, it could reflect different preferences or different utilisation behaviour.

In contrast to the hypothesis, having only good or poor *German language skills* increases the probability of a doctor visit for men, and – in line with the hypothesis – it decreases the probability of a doctor contact for women. However, none of the coefficients is significant. The hypothesis of existing inequity in access to health care due to additional access barriers due to a lack of German language skills is therefore not supported by the data.

As explained above, given the possibility to go to doctors, who can speak the immigrant's mother tongue, it is necessary to control additionally for *mother tongue langue skills*. And indeed, the estimation results show that having only

good or poor mother tongue language skills lowers the probability of a doctor contact for men and women, whereby the effect is only significant for 'good or fair mother tongue langue skills' for men. Hence, having poor language skills in the mother tongue might hamper the possibility to go to foreign doctors. With regard to the definition of inequity in access, it can be concluded that mother tongue language skills matter and should be taken into account in the assessment of inequity in access to health care.

The inclusion of both, mother tongue language skills and German language skills, in the estimation equation might yield somewhat misleading results, because those who speak their mother tongue well and thus go to foreign doctors, they do not need German language skills to access the health care system. The same holds for the other way round, hence, those with good German language skills. To take into account the effect of poor language skills, either in German or in the mother tongue, I constructed three dummy variables: A dummy variable taking the value one if an individual has either very good German language skills or very good mother tongue language skills, a dummy variable taking the value one if the individual has either good or fair German or mother tongue language skills, and a dummy variable taking the value one if the individual has either poor German or mother tongue language skills or speaks none of these languages at all. The estimation result show – in line with the hypothesis of language skills acting as an access barrier – that having only good/fair or poor language skills lowers the probability of a doctor contact. But again, the coefficient is only significant in the men sample. The results can be found in table A4 in the appendix. Overall, regarding the definition of inequity in access, it can be suggested, that for men, language skills play a role for contacting a doctor, and hence, inequity in access with regard to language skills exist.

The estimation results for *ysm* and ysm^2 indicate that increasing duration of residence augments the probability of a doctor contact (positive sign of ysm, only significant for women), but to a decreasing degree (negative sign of ysm^2, again only significant for women). This is in line with the hypothesis, where duration of residence is assumed to be connected with knowledge about the health care system. Hence, increasing knowledge about the health care systems

highers the probability of a doctor contact as access barriers due to a lack of knowledge are reduced.

Having *German nationality* lowers the probability of a doctor visit significantly for women. At first view, this result seems striking, as one would assume that naturalisation goes hand in hand with factors associated with a facilitating of access to health care. However, it should be taken in mind, that a large part (around 84%) of the first-generation immigrants in the sample with German nationality are ethnic Germans, which means that they have received German nationality upon arrival in Germany due to their German roots (see chapter 1.2) and not due to integration aspects.

The *share of foreigners* (on the county level) has a negative influence on the probability of a doctor contact. Though the influence is not found to be significant, this result contradicts the idea that a higher share of foreigners in a region could ease the first contact decision for the immigrants living there, for example, due to possible network effects. As highlighted in chapter 4, including regional information yield a three-level structure of the data, and ignoring the existence of such a hierarchical structure will generally underestimate the standard errors of the regression coefficient, and thus mislead inference (see Moulton 1990). However, as the coefficients for the share of foreigners are not significant even though the standard errors are probably underestimated, I will not provide the results of a multilevel model.

So far, another possible influence factor has been ignored, namely *religious affiliation*. In the timeframe of the analysis, the question has only been asked in 1997 and 2003 in the SOEP. It can be distinguished between undenominational individuals, Christians, and other religions. The group of 'other religions' includes Buddhism, Islam, and Jehovah's Witness, whereby most of the individuals in this group (about 95%) are Moslems. Including religious affiliation reduces the sample size from 19,757 observations to 13,382 observations. The influence of religious affiliation is not found to be significant. The estimation results can be found in table A5 in the appendix.

With regard to the control variables, it is found that men have a significant lower probability to contact a physician. A higher *age* comes along with a higher probability to contact a physician. This has been expected as age

reflects also physical circumstances, and morbidity is expected to increase with age. *Married* individuals show a higher probability of a doctor contact in comparison to singles, widowed, or divorced individuals. However, the effect is only significant in the total sample. In literature, the influence of being married is controversially discussed. Overall, living together with a partner is seen as an important social resource for a positive coping strategy (see Thode et al. 2004: 30), and hence, having a partner is assumed to be an important factor influencing the contact decision. However, the direction of influence is not that clear: Whereas the partner might be worried about the health status of his/her spouse and hence, insists on a doctor visit, a partner can also help to cope with minor illnesses, and hence, hamper the doctor contact. The presence of *young children* (aged 0 to 4 years) in the household augments the probability of a doctor contact. However, the influence is only found to be significant in the women sample. This is reasonable as women might consult the doctor according to reasons linked to childbearing or they might consult a doctor with the baby and record this visit as a doctor visit for themselves. In the literature, there is no consistent explanation for the influence of *years of education.* Whereas more educated individuals have a better recognition of need and a better recognition of the benefits of preventive care, they are also said to be more able to cure trivia on their own. The results show a positive influence of years of education on the contact decision, but the effect is only significant for the total sample and for men. Regarding the *occupational status*, being a blue or white collar worker and being self-employed reduces the probability of a doctor contact significantly in comparison with being non-working or jobless. Being a pensioner, a public servant, and in training increases the probability of a doctor contact, but not significant. *Household income* is found to increase the probability of a doctor visit (significantly in the total sample and in the women sample). This is in line with the hypothesis, whereby income is seen as enabling resource, thus reducing financial barriers to access. The *size of the household* has a significant negative influence on the contact decision. Having *no health insurance* lowers the probability of a doctor contact, but the result is not significant (the insignificance might be caused by the very low proportion reporting to have no health insurance). This negative impact has been expected, because being not insured is an access barrier,

which hampers the contact with the health care system. *Lagged self-rated health* has for all subsamples the expected significant and positive influence: Evaluating the state of health worse than very good higher the probability of a doctor visit. Additionally, having a reduced capacity to work or being severely disabled yield a higher probability to contact a physician.

As outline in section 3.4.7 and in section 4.4.2, the random-effects model incorporates the assumption that the independent variables and the individual-specific effect are not correlated, which is often not tenable. However, the RE-probit model offers the advantage to estimated time-invariant variables. Hence, as a check of robustness and for the sake of completeness, the estimation results of the fixed-effects logit model are provided in table A6 in the appendix. Whereas in the RE-probit model, the influence of poor or fair German language skills has not found to be significant, in the FE-logit model a significant negative influence of poor German language skills on the probability of a first doctor contact for women is found. Also with regard to mother tongue language skills, a significant effect of poor mother tongue language skills on the probability of a doctor contact is found for women. For men and for the total sample, the significant negative influence of poor mother tongue language skills is confirmed. Overall, the importance of language skills as a potential access barrier is confirmed, and the hypotheses of the influence of language skills on the probability to contact a physician cannot be rejected. With regard to years since migration, no significant effect is found in the FE-logit model.

In table 5.4 the estimation results of the first part of the hurdle model for the second-generation are provided.

There is one problem in the interview design of the SOEP with regard to the language skills of the second-generation: The questionnaire has been constructed in a way that the language question is not asked if an individual has German nationality and was born in Germany. In 2003, an additional question has been included in the SOEP questionnaire, namely if the individual has German nationality since birth. If not so, the language question has been

asked. Due to the lack of information about language skills for those born in Germany with German nationality, but with migration background, there are excluded from the analysis until 2003.

As for the first-generation, the estimation is conducted for the total sample and separately for men and women. The sample consists of 631 individuals, 323 men and 308 women. Overall, the total sample consists of 3,206 person-years (1,610 person-years in the men sample and 1,596 in the women sample).

For the first-generation, the country of origin was included in the analysis. This is not possible for the second-generation as all of them were born in Germany. Hence, for the second-generation, the nationality is included in the analysis, which German nationality (those that have German nationality but not since birth) acting as reference. However, none of the estimated coefficients for nationality is significant. With regard to German language skills, it is found that having only poor language skills reduces the probability of a doctor contact for all subsamples, but the effect is only significant for the total sample. This result contradicts the findings for the first-generation and supports the idea of access barriers due to a lack of German language skills among the second-generation. The results with regard to mother tongue language skills are in line with the results found for the first-generation: Having only poor mother tongue language skills decreases the probability of a doctor contact significantly. As for the first-generation, the coefficient is not significant in the women sample.

For men, the *share of foreigners* on the county level is found to insert a significant negative influence. Hence, the higher the share of foreigners, the lower the contact probability. However, so far, the three-level structure of the data is ignored (see chapter 4), and this will generally underestimate the standard errors (see Moulton 1990). Therefore, a multilevel model is estimated taking into account the hierarchical structure of the data. The results of the multilevel for men are presented in table 5.5. The control variables are not displayed, but available upon request. Overall, the results of the multilevel model are in line with the results of the random-effects probit model, and the significance of the coefficient of ‘share of foreigners’ is confirmed. This is an

interesting result as it has been suggested that networks can provide information and thus yield to an improved access to health care services. An explanation for this finding might be related to the findings of Deri (2005): She found an ambiguous influence of networks depending on the specific area: For individuals living in an area with a high utilisation of the language group, access to health care is increased. However, living in an area with a low utilisation of the language group decreases access to health care (ibid: 1090).

Table 5.3: Estimation results for first-generation immigrants: First part of the hurdle model: Random-effects probit model

variables	total sample		men		women	
country of origin						
other EU-countries	-		-		-	
Turkey	0.003	(0.049)	-0.008	(0.066)	0.031	(0.075)
Eastern Europe	-0.102**	(0.051)	-0.115	(0.070)	-0.098	(0.074)
other countries	-0.190**	(0.091)	-0.162	(0.133)	-0.196	(0.125)
German language						
very good	-		-		-	
good / fair	0.020	(0.035)	0.037	(0.048)	-0.006	(0.051)
poor / not at all	0.014	(0.055)	0.030	(0.079)	-0.021	(0.079)
mother tongue						
very good	-		-		-	
good / fair	-0.031	(0.028)	-0.046	(0.038)	-0.013	(0.041)
poor / not at all	-0.326***	(0.094)	-0.450***	(0.129)	-0.187	(0.138)
ysm	0.015**	(0.006)	0.011	(0.009)	0.024**	(0.009)
ysm²	-0.000	(0.000)	-0.000	(0.000)	-0.000**	(0.000)
German nationality	-0.094**	(0.043)	0.029	(0.061)	-0.199***	(0.061)
share of foreigners	-0.004	(0.004)	-0.007	(0.005)	0.000	(0.006)
control variables						
male	-0.413***	(0.035)				
aged 16-25	-		-		-	
aged 26-50	0.047	(0.055)	0.054	(0.084)	0.078	(0.075)
aged 51-65	0.262***	(0.068)	0.318***	(0.101)	0.246**	(0.096)
above 66 years	0.522***	(0.098)	0.651***	(0.139)	0.421***	(0.141)
married	0.070*	(0.042)	0.055	(0.061)	0.063	(0.061)
children 0-4 years	0.056	(0.035)	0.007	(0.049)	0.129**	(0.053)
years of education	0.020***	(0.007)	0.023**	(0.011)	0.017	(0.011)
occupational status						
non-working /jobless	-		-		-	
blue collar	-0.134***	(0.036)	-0.118**	(0.055)	-0.126**	(0.051)
white collar	-0.169***	(0.048)	-0.209**	(0.084)	-0.123**	(0.061)
pensioner	0.026	(0.062)	0.025	(0.084)	0.032	(0.093)
public servant	0.370	(0.289)	0.220	(0.345)	0.706	(0.549)
training	0.079	(0.074)	0.069	(0.104)	0.129	(0.108)
self-employed	-0.582***	(0.081)	-0.693***	(0.105)	-0.323**	(0.138)
log hh income	0.067**	(0.034)	0.060	(0.051)	0.076*	(0.046)
log size of household	-0.201***	(0.058)	-0.163**	(0.079)	-0.261***	(0.086)
no health insurance	-0.240	(0.198)	-0.031	(0.249)	-0.533	(0.325)
lag srh very good	-		-		-	
lag srh good	0.126***	(0.039)	0.130**	(0.052)	0.114*	(0.060)
lag srh fair	0.343***	(0.044)	0.341***	(0.059)	0.342***	(0.066)
lag srh poor	0.649***	(0.053)	0.711***	(0.074)	0.590***	(0.079)
lag srh very poor	0.936***	(0.095)	0.941***	(0.127)	0.947***	(0.143)
disability	0.838***	(0.069)	0.784***	(0.083)	0.907***	(0.129)
number of doctors	0.001***	(0.000)	0.001**	(0.001)	0.001**	(0.001)
time dummy variables	yes		yes		yes	
constant	-0.117	(0.159)	-0.583**	(0.227)	-0.070	(0.230)
Log likelihood	-10923.78		-5759.4131		-5138.3116	
Pseudo-R²	0.05		0.06		0.05	
# observations	19,757		10,065		9,692	
# individuals	3,276		1,661		1,615	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP, waves 1995-2005

Table 5.4: Estimation results for second-generation immigrants: First part of the hurdle model: Random-effects probit model

variables	total sample		men		women	
nationality						
Germany	-		-		-	
other EU-countries	-0.131	(0.131)	-0.147	(0.187)	-0.099	(0.186)
Turkey	-0.210	(0.136)	-0.118	(0.195)	-0.289	(0.192)
Eastern Europe	0.055	(0.146)	-0.100	(0.206)	0.211	(0.209)
other countries	0.377	(0.362)	-0.024	(0.612)	0.706	(0.475)
German language						
very good	-		-		-	
good	0.005	(0.073)	-0.054	(0.094)	0.108	(0.117)
fair / poor / not at all	-0.336**	(0.158)	-0.180	(0.252)	-0.315	(0.215)
mother tongue						
very good	-		-		-	
good	-0.125*	(0.071)	-0.183*	(0.095)	-0.041	(0.106)
fair / poor / not at all	-0.183**	(0.083)	-0.248**	(0.111)	-0.114	(0.126)
share of foreigners	-0.011	(0.008)	-0.026**	(0.011)	0.003	(0.012)
control variables						
male	-0.456***	(0.073)	-		-	
aged 16-25	-		-		-	
aged 26-50	0.159**	(0.077)	0.181*	(0.108)	0.182	(0.113)
aged 51-65	0.147	(0.256)	0.309	(0.323)	-0.447	(0.460)
above 66 years	-0.059	(0.452)	-1.126	(0.776)	0.868	(0.702)
married	0.125	(0.082)	-0.017	(0.120)	0.231**	(0.116)
children 0-4 years	0.144*	(0.086)	0.069	(0.127)	0.193	(0.122)
years of education	0.009	(0.017)	-0.011	(0.022)	0.031	(0.026)
occupational status						
non-working /jobless	-		-		-	
blue collar	0.064	(0.090)	0.245*	(0.131)	-0.073	(0.144)
white collar	0.047	(0.092)	0.188	(0.150)	0.053	(0.125)
pensioner	0.336	(0.415)	1.316*	(0.721)	-0.081	(0.632)
public servant	-0.211	(0.534)	1.015	(0.806)	-	
training	0.042	(0.094)	0.207	(0.137)	-0.033	(0.138)
self-employed	-0.717***	(0.181)	-0.446*	(0.235)	-0.961***	(0.309)
log hh income	0.050	(0.071)	0.079	(0.104)	0.006	(0.101)
log size of household	-0.355***	(0.121)	-0.180	(0.170)	-0.429**	(0.179)
no health insurance	-0.240	(0.388)	-0.755	(0.554)	0.140	(0.620)
lagged SRH						
very good	-		-		-	
good	0.147**	(0.066)	0.207**	(0.086)	0.094	(0.101)
fair	0.324***	(0.088)	0.406***	(0.122)	0.236*	(0.130)
poor	0.726***	(0.143)	0.624***	(0.208)	0.842***	(0.208)
very poor	0.901***	(0.317)	0.919*	(0.543)	0.921**	(0.414)
disability	0.728***	(0.224)	0.736**	(0.303)	0.589*	(0.358)
number of doctors	-0.001	(0.001)	-0.002	(0.001)	-0.000	(0.001)
time dummy variables	yes		yes		yes	
constant	0.937***	(0.331)	0.546	(0.461)	0.534	(0.490)
Log likelihood	-1944.985		-1013.346		-900.817	
Pseudo-R^2	0.03		0.02		0.03	
# observations	3,206		1,610		1,596	
# individuals	631		323		308	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP, waves 1995-2005

Table 5.5: Estimation results for the second-generation, multilevel model

variables	men		women	
German language				
very good	-		-	
good	-0.073	(0.158)	0.150	(0.203)
fair / poor / not at all	-0.235	(0.421)	-0.608	(0.373)
mother tongue				
very good	-		-	
good	-0.301*	(0.160)	-0.070	(0.183)
fair / poor / not at all	-0.379**	(0.189)	-0.226	(0.217)
share of foreigners	-0.047**	(0.021)	0.010	(0.022)
log likelihood	-1011.247		-892.478	
σ_{kkz}	0.352	(0.162)	0.000	(0.248)
$\sigma_{individual}$	0.735	(0.126)	1.041	(0.121)
# observations	1,610		1,596	
# individuals	323		308	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP, waves 1995-2005

5.6.2 Estimation results for the frequency decision

In table 5.6 the estimation results for the frequency decision (zero-truncated negative binomial model) for the first generation are presented. In comparison to the contact decision, the sample size is reduced to 2,952 individuals (1,451 men and 1,501 women). Hence, 324 individuals had no contact with a doctor in the last three month prior to the interview.

With regard to the *country of origin*, no significant effect is found. For *German language skills* the results are similar to the results of the contact decision: Having only good/fair or poor language skills lowers the expected number of doctor visits. As for the contact decision, the effect is only significant for having poor language skills in the men sample. Hence, there seems to be inequity in health care utilisation due to lacking language skills for first-generation immigrant men. Additionally, also *mother tongue language skills* influence the frequency decision: Having only good/fair or poor mother tongue language skills lowers the frequency of doctor visits for all subsamples, but the effect is again only significant for men. A possible explanation for this finding could be that patients with poorer language skills suffer from communication problems with the doctors. Hence, they might not feel

comfortable and substantially reduce doctor visits to emergency visits. Additionally, they might not understand the instruction of the doctor to come back or they might not see the need to come back if there are difficulties in understanding the diagnosis. *Years since migration* seem to have no influence on the frequency of doctor visits, which seems to fit into the hypothesis of years since migration as a proxy for knowledge about the health care system. Whereas this knowledge is essential for the contact decision, once an individual has already accessed the health care system, knowledge plays a minor part assumed that the physician determines the frequency of doctor visits. Overall, the results show that language skills – German and mother tongue language skills – are also of importance in the frequency decision.
As shown in the descriptive statistics, the proportion of immigrants evaluating their language skills as poor or very poor is rather small and only a minority group is therefore affected by the inequity. Nevertheless, it is an important group and one can assume that there might not only be inequity in health care, but also in all other fields where language skills might be important.
As for the contact decision, the share of foreigners on the county level is not found to influence the frequency decision.

In table 5.7 the estimation results for the frequency decision (zero-truncated negative binomial model) for the second-generation are presented. In comparison to the contact decision, the sample size is reduced to 533 individuals (265 men and 268 women). Hence, 98 individuals have not accessed the health care system. It should be taken in mind that the sample size for the frequency decision of the second-generation is therefore rather small.

As the country of origin for the first-generation, the *nationality* of the second-generation seems to have no influence on the frequency decision. Also with regard to *German language skills,* the results are similar to that of the first-generation: Having only good or poor language skills lowers the expected number of doctor visits in comparison to very good German language skills. In contrast to the first-generation, where the effect has only found to be significant for men, for the second-generation, the coefficient of good language skills is significant for women. Hence, there seems to be inequity in

health care utilisation due to lacking language skills for second-generation men and women. In contrast to the first-generation, *mother tongue language skills* seem to have no significant influence on the frequency of doctor visits for the second-generation.

The *share of foreigners* on the county level is found to influence the frequency of doctor visits significantly positive for women. Again, so far, the hierarchical structure of the data has been ignored, thus misleading inference (see Moulton 1990). To the best of my knowledge, there is so far no software package, which can estimate a zero-truncated negative binomial model. Hence, I re-estimated the model by controlling for fixed regional effects by including dummy variables for the regions. Unfortunately, this model is not converging. A possible explanation for that can be the loss of degrees of freedom due to the inclusion of a large amount of dummy variables. Hence, the results with regard to the share of foreigners have to be taken with caution.

Table 5.6: Estimation results: First-generation immigrants: Second part of the hurdle model: Zero-truncated negative binomial model

variables	total sample		men		women	
country of origin						
other EU-countries	-		-		-	
Turkey	0.009	(0.055)	-0.022	(0.087)	0.037	(0.070)
Eastern Europe	-0.045	(0.056)	-0.126	(0.093)	0.006	(0.069)
other countries	-0.030	(0.109)	-0.020	(0.174)	-0.022	(0.130)
German language						
very good	-		-		-	
good / fair	-0.079	(0.051)	-0.108	(0.080)	-0.061	(0.059)
poor / not at all	-0.170**	(0.074)	-0.336***	(0.109)	-0.058	(0.093)
mother tongue						
very good	-		-		-	
good / fair	-0.019	(0.035)	-0.014	(0.054)	-0.018	(0.043)
poor / not at all	-0.267**	(0.110)	-0.517***	(0.185)	-0.150	(0.126)
ysm	-0.001	(0.008)	0.006	(0.014)	-0.005	(0.010)
ysm²	0.000	(0.000)	-0.000	(0.000)	0.000	(0.000)
German nationality	-0.141**	(0.055)	-0.097	(0.084)	-0.174**	(0.068)
share of foreigners	0.000	(0.004)	-0.002	(0.006)	0.002	(0.005)
control variables						
male	-0.062	(0.044)	-		-	
aged 16-25	-		-			
aged 26-50	-0.065	(0.117)	-0.141	(0.270)	-0.017	(0.081)
aged 51-65	-0.032	(0.135)	-0.079	(0.296)	0.004	(0.099)
above 66 years	-0.010	(0.148)	-0.010	(0.308)	-0.004	(0.124)
married	-0.037	(0.053)	0.055	(0.096)	-0.079	(0.062)
children 0-4 years	-0.112**	(0.047)	-0.137*	(0.080)	-0.064	(0.057)
years of education	-0.008	(0.010)	-0.024	(0.015)	0.008	(0.012)
occupational status						
non-working /jobless	-		-		-	
blue collar	-0.166***	(0.050)	-0.296***	(0.092)	-0.076	(0.053)
white collar	-0.335***	(0.065)	-0.505***	(0.126)	-0.265***	(0.070)
pensioner	-0.081	(0.059)	-0.207**	(0.096)	0.000	(0.074)
public servant	-0.195	(0.406)	-1.124***	(0.305)	0.555	(0.468)
training	-0.258***	(0.095)	-0.300*	(0.176)	-0.218**	(0.104)
self-employed	-0.197	(0.145)	- 0.273	(0.206)	-0.251	(0.193)
log hh income	-0.034	(0.039)	-0.021	(0.069)	-0.038	(0.047)
log size of household	-0.053	(0.080)	-0.120	(0.136)	-0.007	(0.089)
no health insurance	-0.452	(0.331)	-0.021	(0.454)	-1.093***	(0.161)
lagged SRH						
very good	-		-		-	
good	0.119	(0.074)	0.177	(0.121)	0.064	(0.084)
fair	0.451***	(0.079)	0.560***	(0.129)	0.365***	(0.089)
poor	0.863***	(0.082)	0.979***	(0.130)	0.768***	(0.097)
very poor	1.211***	(0.097)	1.412***	(0.153)	1.009***	(0.117)
disability	0.484***	(0.049)	0.423***	(0.070)	0.548***	(0.065)
number of doctors	-0.001	(0.000)	-0.000	(0.001)	-0.001	(0.001)
time dummies	yes		yes		yes	
constant	1.251***	(0.201)	1.342***	(0.362)	1.095***	(0.238)
log likelihood	-27603.561		-12730.654		-14803.766	
McFadden's R²	0.04		0.04		0.03	
# observations	12,836		5,958		6,878	
# individuals	2,952		1,451		1,501	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP, waves 1995-2005

Table 5.7: Estimation results: Second-generation immigrants: Second part of the hurdle model: Zero-truncated negative binomial model

variables	total sample		men		women	
nationality						
Germany	-		-		-	
other EU-countries	-0.135	(0.182)	0.191	(0.279)	-0.217	(0.222)
Turkey	-0.145	(0.187)	0.275	(0.281)	-0.294	(0.235)
Eastern Europe	-0.235	(0.196)	-0.271	(0.312)	-0.138	(0.217)
other countries	-0.139	(0.237)	1.156*	(0.599)	-0.229	(0.288)
German language						
very good	-		-		-	
good / fair	-0.150	(0.103)	-0.089	(0.129)	-0.228*	(0.128)
poor / not at all	-0.543***	(0.210)	-0.897**	(0.402)	-0.262	(0.218)
mother tongue						
very good	-		-		-	
good / fair	-0.037	(0.106)	0.120	(0.139)	-0.157	(0.130)
poor / not at all	-0.097	(0.115)	-0.079	(0.173)	-0.102	(0.142)
share of foreigners	0.021**	(0.010)	0.005	(0.015)	0.025**	(0.012)
control variables						
male	-0.395***	(0.096)	-		-	
aged 16-25	-		-		-	
aged 26-50	-0.105	(0.123)	0.066	(0.156)	-0.054	(0.137)
aged 51-65	-0.925***	(0.277)	-0.468	(0.323)	-1.538**	(0.610)
above 66 years	-1.035***	(0.354)	-0.845*	(0.464)	-0.833	(0.683)
married	0.199*	(0.113)	-0.152	(0.166)	0.354***	(0.127)
children 0-4 years	-0.069	(0.122)	-0.102	(0.191)	0.042	(0.141)
years of education	-0.008	(0.022)	-0.030	(0.030)	0.015	(0.025)
occupational status						
non-working /jobless	-		-		-	
blue collar	-0.381**	(0.168)	-0.473*	(0.265)	-0.194	(0.159)
white collar	-0.489***	(0.137)	-0.602**	(0.255)	-0.312**	(0.139)
pensioner	0.381	(0.324)	0.355	(0.398)	0.581	(0.671)
public servant	0.704	(0.555)	0.248	(0.492)	-	
training	-0.608***	(0.198)	-0.744***	(0.278)	-0.320*	(0.168)
self-employed	-0.565	(0.383)	-1.134***	(0.360)	-0.152	(0.434)
log hh income	-0.177*	(0.106)	-0.129	(0.136)	-0.196	(0.125)
log size of household	0.002	(0.172)	0.071	(0.247)	-0.039	(0.193)
no health insurance	-0.540	(0.354)	-0.495	(0.614)	-0.506*	(0.268)
lagged SRH						
very good	-		-		-	
good	-0.029	(0.123)	-0.078	(0.155)	0.076	(0.111)
fair	0.302**	(0.134)	0.084	(0.185)	0.476***	(0.137)
poor	0.624***	(0.145)	0.995***	(0.207)	0.503***	(0.148)
very poor	0.457*	(0.237)	-0.061	(0.459)	0.606**	(0.248)
disability	0.604***	(0.195)	0.667***	(0.187)	0.403*	(0.239)
number of doctors	-0.001	(0.001)	-0.001	(0.002)	-0.001	(0.001)
time dummy variables	yes		yes		yes	
constant	1.795***	(0.471)	1.288*	(0.708)	1.565***	(0.479)
log likelihood	-3524.824		-1252.706		-2226.341	
McFadden's R^2	0.02		0.01		0.01	
# observations	1,809		756		1,053	
# individuals	533		265		268	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP, waves 1995-2005

5.7 Conclusion and discussion

Using eleven waves (1995-2005) from the SOEP, this study analyses if there exists inequity in access to or in the utilisation of health care services due to lacking language skills – German language skills or mother tongue language skills – or due to lacking information about the health care system (approximated by years since migration) among first- and second-generation immigrants in Germany.

Table 5.8 summarises the findings with regard to language skills and years since migration. Regarding the contact decision, German language skills have no significant influence on the probability to contact a doctor for all groups of immigrants. The hypothesis of inequity in access to health care due to access barriers caused by lacking German language skills is therefore not supported by the data. However, mother tongue language skills seem to be important for the contact probability of the first- and second-generation: Having only good or poor mother tongue language skills reduces the probability of a doctor contact. The effect is found to be significant for first- and second-generation men. This might be explained by the fact that immigrants might go to doctors speaking their mother tongue, but having only poor language skills in the mother tongue hampers the possibility to go to foreign doctors.

For the frequency decision, poor German language skills are found to exert a significant influence – in contrast to the contact decision: Those reporting poor language skills have a lower expected number of doctor visits. The effect is found to be significant for first-generation men and for second-generation men and women. Hence, there seems to be inequity in health care utilisation due to lacking German language skills. With the exception of first-generation men – where it is found that poor mother tongue language skills reduce the expected number of doctor visits significantly, no significant effect is found for mother tongue language skills.

Overall, there seem to be significant gender differences with regard to the role of language skills. For women, a significant effect has only been found for German language skills in the frequency decision, whereas for men, language skills seem to be more influential. To explain these different results for men

and women, or rather the underlying mechanism, more qualitative studies are needed.

Table 5.8: Summary of the results with regard to language skills and ysm

	first-generation				**second-generation**	
	men		**women**		**men**	**women**
contact decision	RE	FE	RE	FE		
German language skills						
good / fair	(+)	(+)	(-)	(-)	(-)	(+)
poor / not at all	(+)	(+)	(-)	--	(-)	(-)
mother tongue language skills						
good / fair	(-)	(-)	(-)	(-)	-	(-)
poor / not at all	---	---	(-)	-	--	(-)
years since migration	(+)	(-)	++	(+)	n.a.	n.a.
frequency decision						
German language skills						
good / fair	(-)		(-)		-	-
poor / not at all	---		(-)		--	(-)
mother tongue language skills						
good / fair	(-)		(-)		(+)	(-)
poor / not at all	---		(-)		(-)	(-)
years since migration	(+)		(-)		n.a.	n.a.

+: positive influence, -: negative influence, (): not significant
+++ / --- significant at 1%, ++ / -- significant at 5%, + / - significant at 10%
n.a.: not available
Source: Own compilation

The results indicate that years since migration have an impact on the contact decision of first-generation immigrant women, whereby a significant positive influence is found. Hence, missing knowledge about the health care system could create additional access barriers and yield inequity in access to health care in the group of first-generation women. The duration of residence seems to have no influence on the frequency decision.

It should be taken in mind that the results depend largely on the assumption that we really observe an illness period, or rather that the first contact that is observed is in fact the first contact and not the frequency visit from the time interval before.

Additionally, it should be taken in mind that we can only observe the first contact as a proxy for access. Hence, more (qualitative) studies are necessary

to shed more light on the concept of “access”. More qualitative studies are also desirable to ensure that the influence of language skills is not confounded with other factors such as cultural or behavioural aspects (that could so far not captured by country of origin or religion) or other kinds of integrational aspects.

It should be mentioned that self-assessed language skills might be measured with measurement error, especially if the perception what constitutes ‘good’ or ‘poor’ language skills changes with duration of residence. Future studies should therefore also use additional information in the SOEP connected to language skills (e. g., language spoken at home, contact to Germans, language of newspapers that are read).

Future studies should also extend the existing study on inequity that used the multivariate regression approach by developing the concentration index approach to the case of migration-related inequity in health care.

Finally, to assess the impact of migration-related inequity in access to health care or in the utilisation of health on the HIE, more studies are needed to shed light on the complex relationship between health care and health, especially among the immigrant population (see also section 2.3.2 for a discussion).

6. Summary and conclusion

The so-called "healthy immigrant effect" (HIE) is one of the most striking findings concerning immigrants and their health status. It is usually said to consist of two parts: According to the first part, immigrants are on average healthier than their native peers. This is mostly explained by a kind of self-selection among their origin population, in a way that healthier individuals are more likely to migrate. However, according to the second part, this health gap closes after a relatively short period of time, and thus the health of immigrants is converging to that of the natives or is getting even worse. This gradient of immigrants health has been found in many countries (for Canada, e. g., Deri 2004; McDonald and Kennedy 2004; Newbold and Danforth 2003 or for Australia, e. g., Biddle et al. 2007 or Kennedy and McDonald 2006; for the United States, Antecol and Bedard 2006 or Jasso et al. 2004, for Germany, Lechner and Mielck 1998 as well as Ronellenfitsch and Razum 2004).
The decline of immigrants' health is subject to ongoing research, but the underlying trajectories are not yet fully understood. In literature, there are several different explanations discussed: The adoption of destination-country habits and lifestyles, the structural and material relationship between a low socio-economic status and health, additional stress due to the migration process, persistent barriers to access to health care due to cultural or language factors, as well as a kind of "statistical artefact" explanation due to return migration. As health is a rather complex concept one can assume that none of the proposed explanations can solely contribute to the decline in health, but rather that the decline in health is a result of different interacting causes.

Drawing on data from the German Socio-Economic Panel Study (SOEP), this thesis basically investigates three of the proposed explanations, namely return migration (chapter 3), the adoption of destination-country habits and lifestyles (chapter 4), and immigrants' access and utilisation of health care services (chapter 5). The results of these chapters are shortly summarised in the following.

In chapter 3, the role of health in return migration is investigated using thirteen waves (1993-2005) of the SOEP. The results indicate that men reporting

poorer subjective health or men who are disabled are significantly less likely to return home relative to male immigrants who describe their health as 'very good' or who are not disabled. Additionally, men who have spent at least one night in hospital have a lower (although not significant) probability to remigrate. Hence, overall, healthier men – however health is measured – have a higher probability to remigrate. For women, no clear results for the influence of health on return migration are found. Whereas it is found that women who rate their health as poor have a higher (though not significant) probability to remigrate, disabled women are found to have a lower probability to return back (but again, the coefficient is not significant).

To explain these different results for men and women, a first approach was carried out to take household interdependencies into account. Thereby, it is shown that a good health status of a woman's husband increases the return probability of the woman, but the result is not significant. In contrast, for men whose spouse rates his/her health as very good or good, the return probability is lower, but again the coefficient is not significant. However, the coefficient of good self-rated health remains positive and significant for men, and thus, even when it is controlled for the health status of the partner, men's own health seem to be an important factor influencing return migration.

Overall, the results clearly indicate that health plays a role for return migration. Additionally, at least for men, selection effects caused by a return migration of healthier men could contribute to the deterioration of immigrants' health over time. However, it can be assumed that the effect is rather small as only a small percentage of the sample is remigrating. Additionally, future studies should take into account the (probably) opposed 'selection through death' and jointly estimate the possibility of return migration and death.

Chapter 4 analyses a possible contribution of changing health behaviour (especially, the Body Mass Index (BMI), alcohol consumption, and smoking) with additional years in Germany to the decline of immigrants' health. The idea is that if health behaviour associated with poor health increases with duration of residence in Germany, this might contribute to the observed decline in immigrants' health with years since migration.

The determinants of the BMI are analysed by means of a random-effects model, a fixed-effects model, and a multilevel model, using three waves of the SOEP (2002, 2004, and 2006). The results show that the BMI increases with additional years in Germany for men and women. Thereby, the idea that changes in lifestyle and environment might lead to a weight gain can be supported. Additionally, it is found that the higher the share of foreigners on the county level, the lower is the BMI in the random-effects models for all samples. This is in accordance with the idea that the higher the concentration of foreigners in a region the less likely immigrants are to adopt their health behaviour, and hence, in the case at hand, the lower is their BMI. Furthermore, having poor German language skills yield a higher BMI for all groups, but the effect is only significant for the total sample and the women sample. This contradicts the idea that the BMI increases with acculturation, as having poor language skills hints towards lower acculturation and hence, on theoretical grounds of the acculturation theory, one would have expected a negative sign. Regarding the potential influence of an increase in the BMI to the deterioration of immigrants' health with years since migration it can be concluded that a weight gain might indeed contribute to the decline in health.

The question on alcohol consumption has so far only been included in one wave of the SOEP (2006). Hence, only a cross-section analysis can be carried out in this case. Estimating a multilevel model, it can be shown that an additional year in Germany increases the probability of being abstinent. This contradicts the acculturation hypothesis. However, none of the estimated coefficients is significant. Additionally, it should be taken in mind that the analysis is only cross-sectional, and it is therefore not possible to distinguish between cohort effects and effects of changes over time. The dummy variable for the second-generation is in all subsamples highly significant and positive. Hence, an individual born in Germany having no German citizenship has a higher probability of being abstinent. Again, this contradicts the acculturation hypothesis, where higher alcohol consumption in the second-generation might have been expected. An explanation for that finding could be a kind of 'new-conservatism' of the second-generation. A higher share of foreigners on the county level and having only fair German language skills yield a higher

probability of being abstinent, thereby confirming the assumptions of the acculturation hypothesis.

The data for smoking behaviour are drawn from six waves of the SOEP (1998, 1999, 2001, 2002, 2004, and 2006). Duration of residence is found to have a different influence on the smoking probability for men and women. For men, the coefficient is negative, but not significant. Taking into account, that in many immigrant source countries, the smoking probability is higher than in Germany, this can be interpreted as support for the acculturation hypotheses. Thereby acculturation comes along with 'good' health behaviour, which has in the literature never been taken into account. Therefore, in future studies on health behaviour more attention should be drawn on the possibility of a positive change in the health behaviour (at least for smoking). For women, it is found that the probability of smoking increases with additional years of residence in Germany. As the smoking prevalence for women is in most of the immigrant source countries smaller than for Germany, this finding can again be interpreted as support for the acculturation hypothesis.

Chapter 5 analyses if there is inequity in access to or in the utilisation of health care services due to lacking language skills or due to lacking information about the health care system (approximated by years since migration) among first- and second-generation immigrants in Germany using eleven waves (1995-2005) of the SOEP.

Regarding the contact decision (as a proxy for access), German language skills have no significant influence on the probability to contact a doctor for all groups of immigrants. The hypothesis of inequity in access to health care due to access barriers caused by lacking German language skills is therefore not supported by the data. However, mother tongue language skills seem to be important for the contact probability of the first- and second-generation: Having only good or poor mother tongue language skills reduces the probability of a doctor contact. The effect is found to be significant for first- and second-generation men. This might be explained by the fact that immigrants might go to doctors speaking their mother tongue, but having only poor language skills in the mother tongue hampers this possibility. For the frequency decision (utilisation), poor German language skills are found to

exert a significant influence – in contrast to the contact decision: Those reporting poor language skills have a lower expected number of doctor visits. The effect is found to be significant for first-generation men and for second-generation men and women. Hence, there seems to be inequity in health care utilisation due to lacking German language skills. With the exception of first-generation men – where it is found that poor mother tongue language skills reduce the expected number of doctor visits significantly, no significant effect is found for mother tongue language skills.
The results indicate that years since migration have an impact on the contact decision of first-generation immigrant women, whereby a significant positive influence is found. Hence, missing knowledge about the health care system could create additional access barriers and yield inequity in access to health care in the group of first-generation women. The duration of residence seems to have no influence on the frequency decision.

A shortcoming of this study is that illegal immigrants and asylum seekers cannot be included due to a lack of data as illegal immigrants are not enrolled in any surveys. According to Lindert (2003) illegal immigrants suffer from specific health problems: First, they often suffer from psychological burdens caused by their unsecure or illegal residence status. Second, they often suffer from dangerous conditions of work as labour law principles are often not applied for illegal immigrants. Thirdly, they might be exposed to bad housing conditions and nutrition. Hence, more information on this group is essential to gain a comprehensive picture of the health situation of immigrants in Germany.

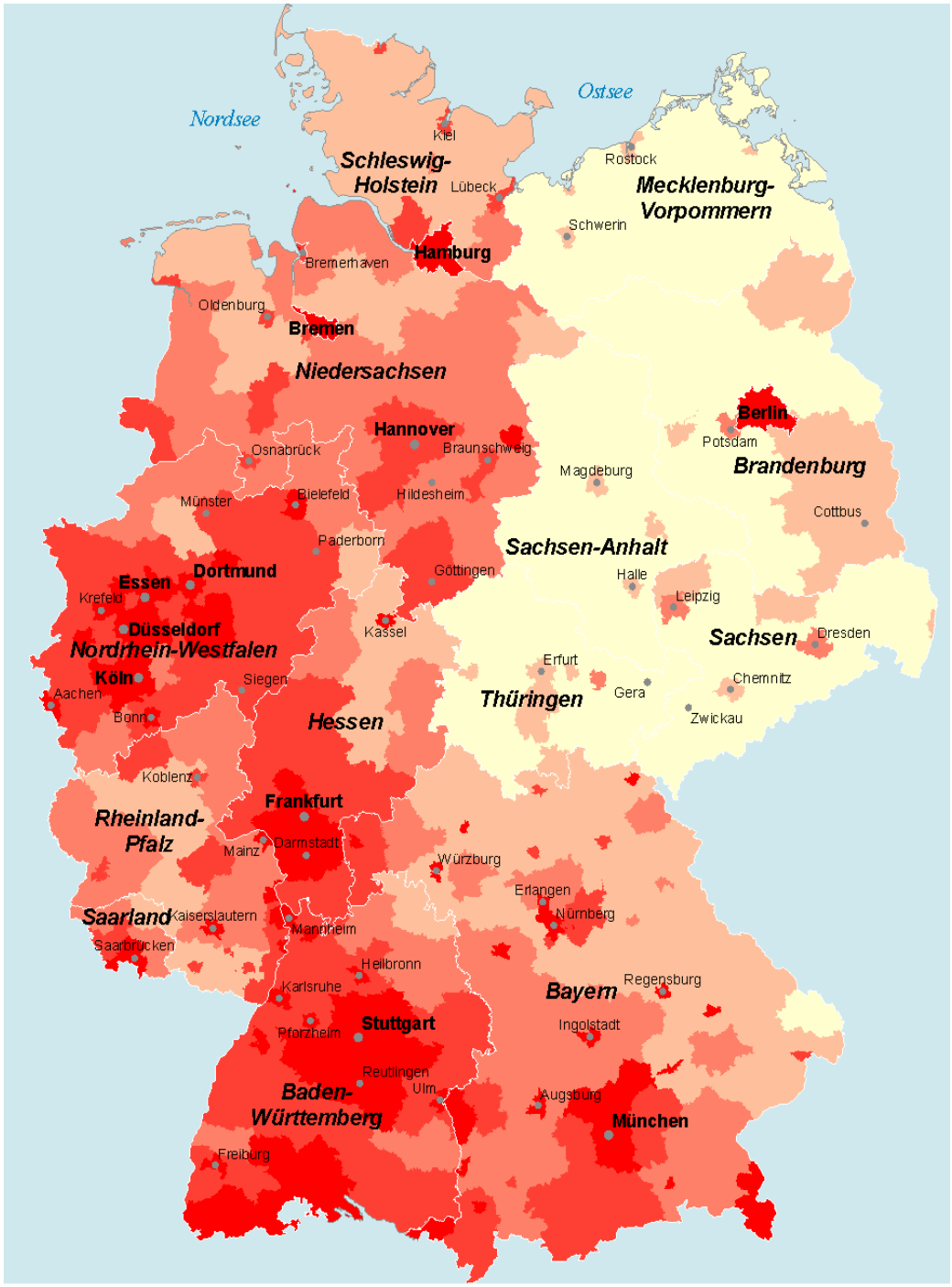
To gain such a comprehensive picture, not only the inclusion of asylum seekers or immigrants living in institutions is important, but also the systematically inclusion of immigrants in epidemiological surveys. Thereby, it is essential to contain a broad array of information such as country of origin or duration of residence

Finally, future studies should not only compare the health of immigrants with the health of of the population of the host country, but also with the health of

the population of the country of origin. This is essential to gain deeper insights, for example, on the effect of migration on health as well as on the influence of a change in environmental exposure or acculturation.

Appendix

Figure A1: Regional share of foreigners in Germany



Source: BBR Data 2007

Table A1: Sample characteristics of table 4.1

variables	mean	std. dev.	min	max
male	0.479	0.499	0	1
age	48.98	16.64	18	99
Germany	0.894	0.308	0	1
other EU-countries	0.036	0.187	0	1
Turkey	0.025	0.157	0	1
Eastern Europe	0.040	0.196	0	1
other countries	0.004	0.066	0	1
German citizenship	0.925	0.263	0	1
married	0.639	0.480	0	1
widowed	0.069	0.254	0	1
single	0.196	0.397	0	1
divorced	0.096	0.295	0	1
children	0.260	0.439	0	1
years of education	11.83	2.51	7	18
non-working / jobless	0.147	0.354	0	1
training	0.049	0.215	0	1
self-employed	0.057	0.232	0	1
pensioner	0.260	0.438	0	1
public servant	0.036	0.186	0	1
white collar	0.279	0.448	0	1
blue collar	0.172	0.377	0	1
own dwelling	0.524	0.499	0	1
household income	36737.61	35304.72	0	583196.40
household size	2.700	1.275	1	13
undenominational	0.304	0.460	0	1
Christ	0.657	0.475	0	1
other religion	0.039	0.193	0	1
ysm	2.31	7.63	0	56
second-generation	0.014	0.117	0	1
German very good	0.920	0.271	0	1
German good/fair	0.069	0.253	0	1
German poor/not at all	0.011	0.105	0	1
share of foreigners	8.198	5.540	0.8	26.2
interviewer present	0.590	0.492	0	1

Number of individuals 18,593. Number of observations: 48,302
Source: SOEP, wave 2002, 2004, 2006.

Table A2: Sample characteristics of table 4.4

variables	mean	std. dev.	min	max
abstinent	0.140	0.347	0	1
male	0.473	0.499	0	1
age	50.47	16.50	20	97
Germany	0.888	0.315	0	1
other EU-countries	0.036	0.187	0	1
Turkey	0.025	0.157	0	1
Eastern Europe	0.045	0.207	0	1
other countries	0.005	0.073	0	1
German citizenship	0.930	0.255	0	1
married	0.639	0.480	0	1
widowed	0.073	0.261	0	1
single	0.184	0.388	0	1
divorced	0.103	0.304	0	1
children	0.240	0.427	0	1
years of education	11.90	2.54	7	18
non-working / jobless	0.142	0.349	0	1
training	0.036	0.185	0	1
self-employed	0.061	0.239	0	1
pensioner	0.279	0.448	0	1
public servant	0.036	0.185	0	1
white collar	0.281	0.449	0	1
blue collar	0.167	0.373	0	1
own dwelling	0.539	0.499	0	1
household income	36593.6	36813.3	0	583196.4
household size	2.63	1.25	1	13
undenominational	0.306	0.461	0	1
Christ	0.656	0.475	0	1
other religion	0.039	0.193	0	1
ysm	2.77	8.69	0	57
second-generation	0.013	0.113	0	1
German very good	0.920	0.271	0	1
German good/fair	0.038	0.192	0	1
German poor/not at all	0.009	0.094	0	1
share of foreigners	8.18	5.47	0.9	26.0
interviewer present	0.58	0.49	0	1

Number of individuals 17,713
Source: SOEP, wave 2006

Table A3: Sample characteristics of table 4.5

variables	mean	std. dev.	min	max
smoking	0.305	0.460	0	1
male	0.477	0.499	0	1
age	47.60	16.55	17	99
Germany	0.891	0.312	0	1
other EU-countries	0.039	0.195	0	1
Turkey	0.027	0.163	0	1
Eastern Europe	0.038	0.191	0	1
other countries	0.004	0.066	0	1
German citizenship	0.917	0.277	0	1
married	0.640	0.480	0	1
widowed	0.066	0.249	0	1
single	0.202	0.402	0	1
divorced	0.092	0.289	0	1
children	0.280	0.449	0	1
years of education	11.74	2.495	7	18
non-working / jobless	0.153	0.360	0	1
training	0.055	0.228	0	1
self-employed	0.056	0.230	0	1
pensioner	0.237	0.425	0	1
public servant	0.036	0.187	0	1
white collar	0.278	0.448	0	1
blue collar	0.183	0.387	0	1
own dwelling	0.505	0.500	0	1
household income	36038.64	33151.97	0	583196.4
household size	2.75	1.28	1	13
undenominational	0.307	0.461	0	1
Christ	0.652	0.476	0	1
other religion	0.041	0.199	0	1
ysm	2.26	7.39	0	56
second-generation	0.015	0.122	0	1
German very good	0.915	0.279	0	1
German good/fair	0.073	0.260	0	1
German poor/not at all	0.012	0.109	0	1
share of foreigners	8.23	5.63	0.7	26.2
interviewer present	0.590	0.491	0	1

Number of observations: 85,994; number of individuals: 19,085
Source: SOEP, waves 1998, 1999, 2001, 2002, 2004, 2006

Table A4: Estimation results, first part of the hurdle model, first-generation, language index

variables	total sample		men		women	
country of origin						
other EU-countries	-		-		-	
Turkey	0.008	(0.049)	-0.007	(0.065)	0.037	(0.075)
Eastern Europe	-0.106**	(0.051)	-0.118*	(0.070)	-0.100	(0.074)
other countries	-0.188**	(0.091)	-0.161	(0.133)	-0.194	(0.125)
language skills						
very good	-		-		-	
good / fair	-0.023	(0.034)	-0.007	(0.047)	-0.039	(0.049)
poor / not at all	-0.076*	(0.043)	-0.104*	(0.061)	-0.063	(0.061)
ysm	0.013**	(0.006)	0.007	(0.009)	0.023**	(0.009)
ysm²	-0.000	(0.000)	0.000	(0.000)	-0.000**	(0.000)
German nationality	-0.112***	(0.042)	0.003	(0.060)	-0.207***	(0.060)
share of foreigners	-0.003	(0.004)	-0.006	(0.005)	0.001	(0.006)
control variables						
male	-0.416***	(0.035)				
aged 16-25	-		-		-	
aged 26-50	0.063	(0.055)	0.080	(0.084)	0.085	(0.075)
aged 51-65	0.289***	(0.068)	0.358***	(0.099)	0.259***	(0.095)
above 66 years	0.549***	(0.097)	0.696***	(0.138)	0.434***	(0.141)
married	0.081*	(0.042)	0.069	(0.061)	0.067	(0.060)
children 0-4 years	0.051	(0.035)	0.000	(0.049)	0.127**	(0.053)
years of education	0.019**	(0.007)	0.022**	(0.011)	0.017	(0.011)
occupational status						
non-working /jobless	-		-		-	
blue collar	-0.136***	(0.036)	-0.120**	(0.055)	-0.126**	(0.051)
white collar	-0.177***	(0.048)	-0.218***	(0.084)	-0.128**	(0.061)
pensioner	0.024	(0.062)	0.025	(0.084)	0.030	(0.093)
public servant	0.356	(0.289)	0.211	(0.345)	0.691	(0.551)
training	0.064	(0.074)	0.046	(0.104)	0.123	(0.107)
self-employed	-0.588***	(0.081)	-0.698***	(0.105)	-0.326**	(0.138)
log hh income	0.064*	(0.034)	0.055	(0.051)	0.074	(0.046)
log size of household	-0.195***	(0.058)	-0.158**	(0.079)	-0.256***	(0.086)
no health insurance	-0.241	(0.198)	-0.039	(0.248)	-0.528	(0.325)
lagged SRH						
very good	-		-		-	
good	0.127***	(0.039)	0.128**	(0.052)	0.116*	(0.060)
fair	0.345***	(0.044)	0.339***	(0.059)	0.345***	(0.066)
poor	0.654***	(0.053)	0.714***	(0.073)	0.594***	(0.079)
very poor	0.937***	(0.095)	0.941***	(0.127)	0.950***	(0.143)
disability	0.836***	(0.069)	0.780***	(0.082)	0.906***	(0.129)
number of doctors	0.001***	(0.000)	0.001**	(0.001)	0.001**	(0.001)
time dummy variables	yes		yes		yes	
constant	-0.072	(0.159)	-0.535**	(0.226)	-0.038	(0.229)
Log likelihood	-10928.59		-5764.5096		-5138.6226	
Pseudo R²	0.05		0.05		0.05	
# observations	19,757		10,065		9,692	
# individuals	3,276		1,661		1,615	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP, waves 1995-2005

Table A5: Estimation results, first part of the hurdle model, first-generation, with the inclusion of religion

variables	total sample		men		women	
other EU-countries	-		-		-	
Turkey	0.084	(0.092)	0.012	(0.127)	0.154	(0.136)
Eastern Europe	-0.078	(0.060)	-0.108	(0.087)	-0.064	(0.084)
other countries	-0.168	(0.105)	-0.117	(0.162)	-0.182	(0.138)
udenominational	-		-		-	
Christian	-0.044	(0.071)	-0.165	(0.102)	0.067	(0.099)
other religion	-0.050	(0.090)	-0.149	(0.123)	0.072	(0.133)
German language						
very good	-		-		-	
good / fair	0.024	(0.042)	0.059	(0.059)	-0.019	(0.060)
poor / not at all	0.077	(0.070)	0.117	(0.100)	0.011	(0.098)
mother tongue						
very good	-		-		-	
good / fair	-0.026	(0.034)	-0.043	(0.047)	-0.012	(0.049)
poor / not at all	-0.226**	(0.115)	-0.378**	(0.160)	-0.079	(0.165)
ysm	0.017**	(0.008)	0.009	(0.011)	0.028**	(0.011)
ysm²	-0.000	(0.000)	-0.000	(0.000)	-0.001**	(0.000)
German nationality	-0.114**	(0.051)	0.009	(0.075)	-0.219***	(0.070)
share of foreigners	-0.006	(0.005)	-0.010	(0.007)	-0.000	(0.007)
control variables						
male	-0.403***	(0.042)	-		-	
aged 16-25	-		-		-	
aged 26-50	0.034	(0.075)	-0.025	(0.116)	0.100	(0.099)
aged 51-65	0.222**	(0.089)	0.199	(0.135)	0.257**	(0.121)
above 66 years	0.487***	(0.120)	0.570***	(0.177)	0.372**	(0.168)
married	0.082	(0.053)	0.158**	(0.078)	-0.009	(0.074)
children 0-4 years	0.022	(0.046)	0.001	(0.065)	0.056	(0.068)
years of education	0.019**	(0.009)	0.015	(0.014)	0.021*	(0.013)
non-working /jobless	-		-		-	
blue collar	-0.137***	(0.044)	-0.075	(0.070)	-0.167***	(0.061)
white collar	-0.166***	(0.058)	-0.171	(0.105)	-0.163**	(0.071)
pensioner	0.027	(0.076)	0.022	(0.107)	0.063	(0.110)
public servant	0.428	(0.306)	0.376	(0.377)	0.653	(0.549)
training	0.127	(0.093)	0.211	(0.135)	0.084	(0.131)
self-employed	-0.533***	(0.099)	-0.584***	(0.133)	-0.383**	(0.162)
log hh income	0.094**	(0.043)	0.128*	(0.066)	0.088	(0.056)
log size of household	-0.326***	(0.073)	-0.354***	(0.103)	-0.361***	(0.107)
no health insurance	-0.236	(0.251)	-0.074	(0.326)	-0.393	(0.394)
lag SRH very good	-		-		-	
lag SRH good	0.131***	(0.048)	0.144**	(0.065)	0.104	(0.072)
lag SRH fair	0.327***	(0.054)	0.327***	(0.074)	0.312***	(0.080)
lag SRH poor	0.676***	(0.066)	0.756***	(0.092)	0.594***	(0.096)
lag SRH very poor	0.988***	(0.122)	1.040***	(0.164)	0.949***	(0.182)
disability	0.928***	(0.087)	0.942***	(0.107)	0.847***	(0.149)
number of doctors	0.001**	(0.000)	0.001*	(0.001)	0.001	(0.001)
time dummies	yes		yes		yes	
constant	-0.053	(0.220)	-0.471	(0.318)	-0.018	(0.311)
Log likelihood	-7435.884		-3820.6478		-3593.2928	
Pseudo-R²	0.05		0.04		0.05	
# observations	13,382		6,702		6,680	
# individuals	2,291		1,138		1,153	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP, waves 1995-2005

Table A6: Estimation results, fixed-effects logit model for first-generation immigrants

variables	total sample		men		women	
country of origin	-		-		-	
other EU-countries						
Turkey						
Eastern Europe						
other countries						
German language						
very good	-		-		-	
good / fair	-0.001	(0.081)	0.121	(0.108)	-0.157	(0.124)
poor / not at all	-0.175	(0.133)	0.004	(0.184)	-0.402**	(0.196)
mother tongue						
very good	-		-		-	
good / fair	-0.109*	(0.063)	-0.095	(0.084)	-0.142	(0.097)
poor / not at all	-0.796***	(0.233)	-0.969***	(0.314)	-0.601*	(0.357)
ysm	-0.020	(0.019)	-0.039	(0.027)	0.011	(0.029)
ysm²	0.001	(0.000)	0.001**	(0.001)	-0.000	(0.001)
German nationality	0.139	(0.139)	0.470**	(0.194)	-0.203	(0.204)
share of foreigners	-0.021	(0.016)	-0.019	(0.021)	-0.019	(0.025)
control variables						
male	-		-		-	
aged 16-25	-		-		-	
aged 26-50	0.099	(0.125)	0.016	(0.186)	0.196	(0.174)
aged 51-65	0.375**	(0.175)	0.280	(0.248)	0.490*	(0.251)
above 66 years	0.770***	(0.260)	0.645*	(0.354)	0.895**	(0.393)
married	-0.134	(0.121)	-0.189	(0.173)	-0.067	(0.174)
children 0-4 years	0.078	(0.072)	0.012	(0.099)	0.157	(0.108)
years of education	0.033	(0.025)	0.032	(0.034)	0.027	(0.037)
occupational status						
non-working /jobless	-		-		-	
blue collar	-0.175**	(0.076)	-0.086	(0.110)	-0.261**	(0.109)
white collar	-0.211**	(0.104)	-0.264	(0.182)	-0.172	(0.129)
pensioner	-0.304**	(0.144)	-0.277	(0.192)	-0.366*	(0.223)
public servant	0.864	(0.650)	0.739	(0.796)	1.180	(1.188)
training	0.141	(0.156)	0.017	(0.217)	0.351	(0.233)
self-employed	-0.553***	(0.186)	-0.822***	(0.247)	-0.099	(0.301)
log hh income	0.065	(0.080)	0.049	(0.123)	0.058	(0.108)
log size of household	-0.399***	(0.155)	-0.284	(0.205)	-0.559**	(0.245)
no health insurance	-0.024	(0.400)	0.401	(0.483)	-0.623	(0.701)
lag srh very good	-		-		-	
lag srh good	-0.061	(0.072)	-0.112	(0.096)	-0.009	(0.110)
lag srh fair	0.015	(0.083)	-0.062	(0.113)	0.104	(0.126)
lag srh poor	0.264**	(0.104)	0.267*	(0.142)	0.264*	(0.155)
lag srh very poor	0.515***	(0.198)	0.405	(0.265)	0.637**	(0.302)
disability	0.794***	(0.169)	0.739***	(0.200)	0.895***	(0.327)
number of doctors	0.002*	(0.001)	0.003	(0.002)	0.002	(0.002)
time dummy variables	no		no		no	
Log likelihood	-5760.7622		-3082.1717		-2662.2026	
# observations	14,137		7,457		6,680	
# individuals	1,983		1,035		948	

Standard error in parentheses
*** significant at 1%, ** significant at 5%, *significant at 10%
Source: SOEP, waves 1995-2005

References

Abel, T. (1992): Konzept und Messung gesundheitsrelevanter Lebensstile, in: *Prävention,* 15 (4): 123-128.

Abel, T. (1984): Ausländer und Sport – Sportliche Aktivitäten als Freizeitinhalt ausländischer Familien in der Bundesrepublik. Mit einer Studie über Verhaltensdeterminanten und Strukturelemente im Ausländersport, Pahl-Rugenstein Verlag, Köln.

Abraido-Lanza, A. F., Dohrenwend, B. P., Ng-Mak, D. S. and Turner, J. B. (1999): The Latino Mortality Paradox: A Test of the "Salmon Bias" and Healthy Migrant Hypotheses, in: *American Journal of Public Health*, 89 (10): 1543-1548.

Aday, L. A. and Andersen, R. M. (1974): A Framework for the Study of Access to Medical Care, in: *Health Service Research,* 9 (3): 208–220.

Akresh, I. R. (2007): Dietary assimilation and health among Hispanic immigrants to the United States, in: *Journal of Health and Social Behaviour,* 48 (4): 404-17.

Ali, J. (2002): Mental Health of Canada's Immigrants, in: *Supplement to Health Reports,* 13, Statistics Canada, Catalogue 82-003.

Allison, P. D. (1985): Event History Analysis, Regression for longitudinal event data, Sage Publication, Beverly Hills.

Andersen, R. M. (1968): A Behavioural Model of Families' Use of Health Services. Research Series. Chicago: Center for Health Administration Studies, The University of Chicago.

Andersen, R. M. (1995): Revisiting the behavioural model and access to medical care: Does it matter?, in: *Journal of Health and Social Behaviour*, 36: 1-10.

Andersen, H. H., Grabka, M., and Schwarze, J. (2008): Gesundheit, Einstellungen und Verhalten, in: Statistisches Bundesamt, Noll, H.H., and Habich, R. (eds.): Auszug aus dem Datenreport 2008: Ein Sozialbericht für die Bundesrepublik Deutschland, Chapter 9.2.

Andersen, R. and Newman, J. (2005): Societal and individual determinants of medical care utilisation in the United States, in: *The Milbank Quarterly*, 28 (4): 1-18.

Andersen, H. H. and Schwarze, J. (2003): Bedarfsprofile in der gesetzlichen Krankenversicherung. Zur Analyse gruppenspezifischer Unterschiede bei der Inanspruchnahme des Gesundheitsversorgungssystems, *Veröffentlich-ungsreihe des Berliner Zentrums Public Health*, Berlin.

Andersen, H. H. and Schwarze, J. (1997): Angebotsinduzierte Nachfrage bei zunehmendem Wettbewerb? Eine empirische Analyse der Inanspruch-nahme ambulanter ärztlicher Leistungen, *Veröffentlichungsreihe des Berliner Zentrums Public Health*, Berlin.

Antecol, H. and Bedard, K. (2006): Unhealthy Assimilation: Why Do Immigrants Converge to American Health Status Levels?, in: *Demography*, 43 (2): 337-360.

Bade, K. J. and Oltmer, J. (2004): Normalfall Migration, Bundeszentrale für politische Bildung, Bonn.

Bago d'Uva T. (2005): Latent class models for utilisation of primary care: evidence from a British panel, in: *Health Economics*, 14 (9): 873-892.

Balcazar, H. and Krull, J. L. (1999): Determinants of Birth-Weight Outcomes among Mexican-American Women: Examining Conflicting Results about Acculturation, in: *Ethnicity and Disease*, 9 (3): 410-422.

Baltagi, B. H. (2001): Econometric analysis of panel data, Chichester, John Wiley & Sons, 2nd ed.

Bates, L., Acevedo-Garcia, D., Alegria, M. and Krieger, N. (2008): Immigration and Generational Trends in Body Mass Index and Obesity in the United States: Results of the National Latino and Asian American Survey, 2002-2003, in: *American Journal of Public Health*, 98 (1): 70-77.

Becher, S., Sumadi, C., Güthoff, D. and Haas, J. (1997): Ausländische Arbeitnehmer in der Bundesrepublik Deutschland. Eine Auswertung von betriebsärztlich untersuchten Gastarbeitern zur Feststellung von Gesundheitsstörungen, in: *Das Gesundheitswesen*, 59 (3): 174-180.

Beck, N., Katz, J. N. and Tucker, R. (1998): Taking Time Seriously: Time-Series-Cross-Section Analysis with Binary Dependent Variables, in: *American Journal of Political Science*, 42 (4): 1260-1288.

Bennett, S. A. (1993): Inequalities in risk factors and cardiovascular mortality among Australias immigrants, in: *Australian Journal of Public Health*, 17: 251-261.

Bhopal, R. S. and Rankin, J. (1996): Cancer in ethnic minorities: setting priorities based on epidemiological data, in: *British Journal of Cancer*, 74 (suppl XXIX): 522-32.

Biddle, N., Kennedy, S. and McDonald, J. T. (2007): Health assimilation patterns among Australian immigrants, in: *The Economic Record*, 83 (260): 16-30.

Birch, S., Eyles, J. and Newbold, K. B. (1993): Equitable access to health care: methodological extensions to the analysis of physician utilization in Canada, in: *Health Economics*, 2: 87-101.

Black, R., Koser, K. and Munk, K. (2004): Understand voluntary return. Home Office Online Report 50/04. Home Office, Research, Development and Statistic Directorate: London.

Blossfeld, H.-P. and Rohwer, G. (2002): Techniques of Event History Modeling, Erlbaum, Mahwah.

Böhning, W. R. (1981): Estimating the propensity of guestworkers to leave, in: *Monthly Labour Review*, Communications, 104 (5): 37-40.

Bollini, P. and Siem, H. (1995): No real progress towards equity. Health of migrants and ethnic minorities on the eve of the year 2000, in: *Social Science & Medicine*, 41 (6): 819-828.

Borde, T. (2002): Patientinnenorientierung im Kontext der soziokulturellen Vielfalt im Krankenhaus. Vergleich der Erfahrungen und Wahrnehmungen deutscher und türkischsprachiger Patientinnen sowie des Klinikpersonals zur Versorgungssituation in der Gynäkologie. Dissertation. Technische Universität Berlin, Fakultät VIII – Wirtschaft und Management, Berlin.

Borde, T., Braun, T. and David, M. (2003): Unterschiede in der Inanspruchnahme klinischer Notfallambulanzen durch deutsche Patienten/innen und Migranten/innen – Problembeschreibung, Ursachen-analyse, Lösungsansätze. Schlussbericht zum Forschungsprojekt. BMBF und Spitzenverbände der Krankenkassen, Förderkennzeichen 01 GL 0009. Berlin.

Borjas, G. J. (1995): Assimilation and Changes in Cohort Quality Revisited: What Happened to Immigrant Earnings in the 1980s?, in: *Journal of Labor Economics,* 13 (2): 201-45.

Borjas, G. J. (1985): Assimilation, Changes in Cohort Quality, and the Earnings of Immigrants, in: *Journal of Labor Economics* 3 (4): 463-89.

Borjas, G. J. and Bratsberg, B. M. (1994): Who Leaves? The Outmigration of the Foreign Born, in: *NBER Working Paper*, No. 4913.

Braun, T. (2004): Einfluss von Geschlecht, Ethnizität und Alter auf die Inanspruchnahme von Rettungsstellen und die dortige Behandlung. Dissertation Medizinischen Fakultät Charite – Universitätsmedizin Berlin.

Brecht, B. (1994): Remigration von Gastarbeitern – Statistische Modellierung von Rückkehrprozessen, Universität Konstanz, Dissertation.

Breyer, F. (1984): Die Nachfrage nach medizinischen Leistungen. Eine empirische Analyse von Daten aus der Gesetzlichen Krankenversicherung, Berlin: Springer.

Breyer, F., Zweifel, P., and Kifmann, M. (2005): Gesundheitsökonomik, Springer, Berlin et al., 5th edition, chapter 3.

Brodhun, B., Altmann, D. and Haas, W. (2008): Bericht zur Epidemiologie der Tuberkulose in Deutschland für 2006, Berlin: Robert-Koch-Institut.

Bundesamt für Bauwesen und Raumordnung (BBR) (2004): Aktuelle Daten zur Entwicklung der Städte, Kreise und Gemeinden, Berichte Band 17. Bundesamt für Bauwesen und Raumordnung, Selbstverlag, Bonn.

Bundesamt für Migration und Flüchtlinge (BAMF) [Federal Office for Migration and Refugees] (2006): Migrationsbericht des Bundesamtes für Migration und Flüchtlinge im Auftrag der Bundesregierung (Migrationsbericht 2006), Nürnberg: BAMF.

Bundesamt für Migration und Flüchtlinge (BAMF) [Federal Office for Migration and Refugees] (2006): Migrationsbericht des Bundesamtes für Migration und Flüchtlinge im Auftrag der Bundesregierung (Migrationsbericht 2006), Nürnberg: BAMF.

Burström, B. and Fredlund, P. (2001): Self-rated health: Is it as good as predictor of subsequent mortality among adults in lower as well as in higher social classes?, in: *Journal of Epidemiology and Community Health*, 55: 836-840.

Butler, J. S., Burkhauser, R. V. and Mitchell, J. M. (1987): Measurement Error in Self-Reported Health Variables, in: *Review of Economics and Statistics*, 69 (4): 644-50.

Cairney, J. and Øsbye, T. (1999): Time Since Immigration and Excess Body Weight, in: *Canadian Journal of Public Health*, 90 (2): 120-124.

Cameron, A. C. and Trivedi, P. K. (1998): Regression Analysis of Count Data. Cambridge.

Carrington, W. J., Detragiache, E. and Vishwanath, T. (1996): Migration with Endogenous Moving Costs, in: *American Economic Review*, 86 (4): 909-930.

Cawley, J., Grabka, M. M. and Lillard, D. R. (2005): A comparison of the relationship between obesity and earnings in the US and Germany, in: *Schmollers Jahrbuch* 125: 119-129.

Chandola, T. and Jenkinson, C. (2000): Validating self-rated health in different ethnic groups, in: *Ethnicity & Health*, 5 (2): 151-159.

Chen, J., Ng, E. and Wilkins, R. (1996): The Health of Canada's Immigrants in 1994-95, in: *Health Reports* 7 (4): 33-45.

Chiswick, B. (1978): The effects of Americanization on the earnings of foreign born men, in: *Journal of Political Economy*, 86: 897-921.

Chiswick, B. R., Lee, Y. L. and Miller, P. W. (2006): Immigrant selection systems and immigrant health, in: *IZA Discussion Paper*, No. 2345, Institute for the Study of Labor (IZA), Bonn.

Chiswick, B. and Miller, P. W. (2002): Do enclaves matter in immigrant adjustment?, in: *IZA Discussion Paper*, No. 449, Institute for the Study of Labor (IZA), Bonn.

Cho, Y., Frisbie, W. P., Hummer, R. A. and Rogers, R. G. (2004): Nativity, Duration of Residence, and the Health of Hispanic Adults in the United States, in: *International Migration Review*, 38 (1): 184-211.

Cobb-Clark, D. A. and Hildebrand, V. (2006): The wealth and asset holdings of U.S.-born and foreignborn households: Evidence from SIPP Data, in: *Review of Income and Wealth*, 52 (1): 17-42.

Cohen, R. (1996): Theories of Migration, An Elgar Refernce Collection, Cheltenham, Brookfield.

Collatz, J. (1998): Kernprobleme des Krankseins in der Migration – Versorgungsstruktur und ethnozentristische Fixiertheit im Gesundheitswesen, in: David, M., Borde, T. and Kentenich, H. (eds.): Migration und Gesundheit: Zustandsbeschreibung und Zukunftsmodelle, Mabuse-Verlag: Frankfurt am Main, pp.: 33-58.

Collatz, J. (1994): Zur Realität von Krankheit und Krankheitsversorgung von Migranten in Deutschland, in: *Jahrbuch für kritische Medizin*, 23, pp.: 101-123.

Collatz, J. (1989): Brennpunkte sozialer Ungleichheit bei der medizinischen Versorgung ausländischer Arbeitnehmer und Flüchtlinge in der Bundesrepublik Deutschland, in: *Zeitschrift für Sozialreform*, 35 (11/12): 682-696.

Collins, E. and Klein, R. (1980): Equity in the NHS: Self-reported morbidity, access and primary care, in: *BMJ*, 281: 1111-1115.

Constant, A. and Massey, D. S. (2003): Self-selection, earnings and out-migration: A longitudinal study of immigrants to Germany, in: *Journal of Population Economics*, 16: 631-653.

Constant, A. and Massey, D. S. (2002a): Self-selection, earnings and out-migration: a longitudinal study of immigrants to Germany, in: *IZA Discussion Paper,* No. 672, Institute for the Study of Labor (IZA), Bonn.

Constant, A. and Massey, D. S. (2002b): Return Migration by German Guestworkers: Neoclassical versus New Economic Theories, in: *International Migration*, 40 (4): 5-38.

Courbage, Y. and Khlat, M. (1996): Mortality and causes of death of Moroccans in France, 1979–91, in: *Population: an English selection,* 8: 59-94.

Currle, E. (2006): Theorieansätze zur Erklärung von Rückkehr und Remigration, in: *soFid Migration und ethnische Minderheiten* 2006/2.

David, M. and Borde, T. (2001): Kranksein in der Fremde? Türkische Migrantinnen im Krankenhaus. Mabuse-Verlag, Frankfurt/Main.

Deb, P. and Holmes, A. M. (2000): Estimates of use and costs of behavioural health care: a comparison of standard and finite mixture models, in: *Health Economics*, 9: 475-489.

Deb, P. and Trivedi, P. K. (1997): Demand for Medical Care by the elderly: A Finite Mixture Approach, in: *Journal of Applied Econometrics*, 12: 313-336.

Deb, P. and Trivedi, P. K. (2002): The structure of demand for health care: latent class versus two-part models, in: *Journal of Health Economics*, 21: 601-625.

Deri, C. (2005): Social networks and health service utilization, in: *Journal of Health Economics*, 24: 1076-1107.

Deri, C. (2004): Understanding the „Healthy migrant effect“, in*: Canada Working Paper*, 0502E, University of Ottawa.

Dietz, B. (1999): Ethnic German Immigration from Eastern Europe and the Former Soviet Union to Germany: The Effects of Migrant Networks, in: *IZA Discussion Paper*, No. 68, Institute for the Study of Labor (IZA), Bonn.

Dietz, B. (2003): Post-soviet Youth in Germany: Group Formation, Values and Attitudes of a New Immigrant Generation, in: Horowitz, T., Kotik-Friedgut, B. and Hoffmann, S. (eds.): From Pacesetters to Dropouts. Post-Soviet Youth in Comparative Perspective. New York/Oxford: University Press of America, pp.: 253-271.

Dill, H., Frick, U., Höfer, R., Klöver, B. and Straus, F. (2002): Risikoverhalten junger Migrantinnen und Migranten. Expertise für das Bundesministerium für Gesundheit. Schriftenreihe des Bundesministeriums für Gesundheit, Band 141/1, Nomos, Baden-Baden.

Djajic, S. (1989): Migrants in a Guest-Worker System – A Utility Maximizing Approach, in: *Journal of Development Economics*, 31: 327-339.

Djajic, S. and Milbourne, R. (1988): A General Equilibrium Model of Guest-Worker Migration: A Source-Country-Perspective, in: *Journal of International Economics*, 25: 335-351.

Donavan, J. L., d'Espaignet, C., Merton, C. and Van Ommeren, M. (1992): Immigrants in Australia: a health profile, in: *Ethnic Health Series*, 1, Canberra: Australian Institute of Health and Welfare.

Duleep, H. O. and Regets, M. C. (2002): The Elusive Concept of Immigrant Quality: Evidence from 1970-1990, in: *IZA Discussion Paper*, No. 631, Institute for the Study of Labor (IZA), Bonn.

Dunn, J. R. and Dyck, I. (2000): Social determinants of health in Canada's immigrant population: Results from the National Population Health Survey, in: *Social Science & Medicine*, 51: 1573-93

Dustmann, C. (2003): Children and return migration, in: *Journal of Population Economics*, 16: 815-830.

Dustmann, C. (2001): Why go back? Return motives for migrant workers, in: Djajic, S. (ed.): International migration: trends, policies and economic impact, Routledge Contemporary Economic Policy Issues, London, pp.: 229-248.

Dustmann, C. (1995): Savings behaviour of migrant workers: A life-cycle analysis, in: *Zeitschrift für Wirtschafts- und Sozialwissenschaften*, 115: 511-533.

Elkeles, T. and Mielck, A. (1997): Entwicklung eines Modells zur Erklärung gesundheitlicher Ungleichheit, in: *Das Gesundheitswesen*, 59: 137-143.

Elkeles, T., and Seifert, W. (1996): Immigrants and health: Unemployment and health-risks of labour migrants in the federal republic of Germany, 1984-1992, in: *Social Science & Medicine*, 43: 1035-1047.

Erb, J. and Winkler, G. (2004): Rolle der Nationalität bei Übergewicht und Adipositas bei Vorschulkindern, in: *Monatsschrift Kinderheilkunde*, 152 (3): 291-298.

Ezzati, M., Martin, H., Skjol, S., Vander Hoorn, S. and Murray, C. J. L. (2006): Trends in national and state-level obesity in the United States, in: *Journal of the Royal Society of Medicine*, 99 (5): 250-257.

Federal Statistical Office Germany (2008): Bevölkerung und Erwerbstätigkeit – Bevölkerung mit Migrationshintergrund – Ergebnisse des Mikrozensus 2006 – Fachserie 1 Reihe 2.2, Wiesbaden.

Federal Statistical Office Germany (2007): Table: Gebiet und Bevölkerung – Ausländische Bevölkerung, available online (accessed on: 16th June 2008): http://www.statistik-portal.de/Statistik-Portal/de_jb01_jahrtab2.asp

Federal Statistical Office Germany (2006): Leben in Deutschland, Haushalte, Familien und Gesundheit – Ergebnisse des Mikrozensus 2005, Wiesbaden.

Ferber, C. von (1979): Gesundheitsverhalten, in: Siegrist, J. and Hendel-Kramer, A. (eds.): Wege zum Arzt. München et al., pp.: 7-23.

Fertig, Michael (2004), The Societal Integration of Immigrants in Germany, *RWI Discussion Paper*, No. 18.

Ferrer-I-Carbonell, A. and Van Praag, B. M. S. (2003): Income satisfaction inequality and its causes, in: *Journal of Economic Inequality*, 1: 107-127.

Franzini, L., Ribble, J. C. and Keddie, A. M. (2001): Understanding the Hispanic paradox, in: *Ethnicity and Disease*, 11: 496-518.

Frederiks, A. M., Van Buuren, S., Sing, H., Remy, A., Wit, J. M. and Verloove-Vanhorick, S. P. (2005): Alarming prevalences of overweight and obesity for children of Turkish, Moroccan and Dutch origin in The Netherlands according to international standards, in: *Acta Pediatrica*, 94 (4): 496-498.

Frisbie, W. P., Youngtae, C., and Hummer, R. A. (2001): Immigration and the health of Asian and Pacific Islander adults in the United States, in: *American Journal of Epidemiology*, 153 (4): 372–380.

Funkhouser, E. and Trejo, S. J. (1995): The labor market skills of recent male immigrants: Evidence from the Current Population Survey, in: *Industrial and Labor Relations Review*, 48 (4): 792-811.

Gee, E. M., Kobayashi, K. M. and Prus, S. G. (2003): Examining the "Healthy Immigrant Effect" in Later Life: Findings from the Canadian Community Health Survey, in: *SEDAP Research Paper,* No. 98.

Gerdtham, U.-G. (1997): Equity in Health Care Utilization: Further Tests Based on Hurdle Models and Swedish Micro Data, in: *Health Economics*, 6: 303–319.

Gerdtham, U. and Trivedi, P. K. (2000): Equity in Swedish health care reconsidered: new results based on the finite mixture model, in: *Working Paper Series in Economics and Finance*, Stockholm School of Economics.

Geronimus, A. T., Bound, J., Waidmann, T. A., Hillemeier, M. M. and Burns, P. B. (1996): Excess Mortality among Blacks and Whites in the United States, in: *New England Journal of Medicine*, 335: 1552-1558

Gillon, R. (1986): *Philosophical Medical Ethics*, Wiley, Chichester, New York.

Gjonça, A., and Bobak, M. (1997): Albanian paradox, another example of the protective effect of Mediterranean lifestyle?, in: *Lancet*, 350: 1815–1817.

Globerman, S. (1998): Immigration and health care utilization patterns in Canada, in: *Research on Immigration and Integration in the Metropolis (RIIM) Working Paper Series*, No. 98-08, Vancouver Centre of Excellence.

Goel, M. S., McCarthy, E.P., Phillips, R.S. and Wee, C.C. (2004): Obesity among US immigrant subgroups by duration of residence, in: *JAMA*, 292: 2860-2867.

Gordon-Larsen, P., Mullan Harris, K., Ward, D. S. and Popkin, B. M. (2003): Acculturation and overweight-related behaviors among Hispanic immigrants to the US: The National Longitudinal Study of Adolescent Health, in: *Social Science & Medicine* 57 (11): 2023-2034.

Greene, W. H. (2003): *Econometric analysis*, Prentice Hall International, Upper Saddle River, New Jersey, 5th edition.

Grieger, D. (2002): Migration und Gesundheit – Das Gesundheitswesen muss sich interkulturell öffnen, in: *AiD* (Ausländer in Deutschland), 18 (1).

Groot, W. (2000): Adaptation and scale of reference bias in self-assessments of quality of life, in: *Journal of Health Economics*, 19: 403-420.

Grootendorst, P. V. (1995): A. comparison of alternative models of prescription drug utilization, in: *Health Economics*, 4: 183-198.

Grossman, M. (1972): On the concept of health capital and the demand for health care, in: *Journal of Political Economy*, 80: 223-255.

Grüber, C. (2005): Asthma und Allergie bei türkischstämmigen Kindern in Berlin, in: Borde, T. and David, M. (eds.): Kinder und Jugendliche mit Migrationshintergrund. Lebenswelten, Gesundheit und Krankheit, Frankfurt am Main: Mabuse, pp.: 161-167.

Gundel, S. and Peters, H. (2008): What Determines the Duration of Stay of Immigrants in Germany? Evidence from a Longitudinal Duration Analysis, in: *International Journal of Social Economics*, 35 (11): 769-782.

Gurmu, S. (1997): Semi-Parametric Estimation of Hurdle Regression Models with an Application to Medicaid Utilisations, in: *Journal of Applied Econometrics*, 12, 225-242.

Haisken-DeNew, J.-P., Büchel, F. and Wagner, G. G. (1997): Assimilation and Other Determinants of School Attainment in Germany: Do Immigrant Children Perform as Well as Germans?, in: *Vierteljahrshefte zur Wirtschaftsforschung*, 66(1): 169-79.

Haisken-DeNew, J.-P. and Frick, J. R. (2005): DTC – Desktop Companion to the German Socio-economic Panel Study (SOEP), 8th edition, DIW, Berlin. Online: http://www.diw.de/english/sop/service/dtc/ (accessed 10th January, 2006).

Halli, S. S. and Anchan, J. P. (2005): Structural and behavioural determinants of immigrant and non-immigrant health status: Results from the Canadian community health survey, in: *Journal of International Migration and Integration*, 6 (1): 93-123.

Hamilton, B. H., Ho, V., Paarsch, H. J. (1997): The distribution of outpatient services in Canada and the US: An empirical model of physician visits, Working Paper (John M. Olin School of Business, St. Luis, Washington University.

Harris, J. R. and Todaro, M. P. (1970): Migration, Unemployment, and Development: A two sector-Analysis, in: *American Economic Review*, 60: 126-142.

Haug, S. and Sauer, E. (2006): Bestimmungsfaktoren internationaler Migration: Ein Überblick über Theorien zur Erklärung von Wanderungen, in: *soFid, Migration und ethnische Minderheiten*, 2006/1: 7-34.

Heckman, J. J. and Singer, B. (1984): A method of minimizing the distributional impact in econometric models for duration data, in: *Econometrica* 52: 271-320.

Helmert, U. (2000): Armutsbezogene Gesundheitsberichterstattung in Deutschland: Status Quo, Konzepte und empirische Befunde, in: Laaser, U., Gebhardt, K. and Kemper, P. (eds.): Gesundheit und soziale Benachteiligung. Informationssysteme – Bedarfsanalysen – Interventionen Lage: Hans Jacobs, pp.: 83-94.

Helmert, U., Shea, S., Herman, B. and Greiser, E. (1990): Relationship of social class characteristics and risk factors for coronary heart disease in West Germany, in: *Public Health*, 104: 399-416.

Heyden, H. (1986): Kontinuität und Diskontinuität der Ausländerpolitik, in: Papalekas, J. C. (ed.): Strukturwandel des Ausländerproblems. Bochum: Brockmeyer, pp.: 72-80.

Hilbe, J. M. (2007): *Negative Binomial Regression*, Cambridge University Press, New York.

Hill, J. K. (1987): Immigrant decision concerning duration of stay and migratory frequency, in: *Journal of Development Economics*, 25: 221- 234.

Holst, E., Dean, L. R. and DiPrete, T. A. (2000): Proceedings of the Fourth International Conference of German Socio-Economic Panel Study Users (SOEP2000), in: *Vierteljahrshefte zur Wirtschaftsforschung*, 70 (1): 7-14.

Hönekopp, E. (1987): Rückkehrförderung und die Rückkehr ausländischer Arbeitnehmer und ihrer Familien, in: Hönekopp, E. (ed.): Aspekte der Ausländerbeschäftigung in der Bundesrepublik Deutschland. Beiträge zur Arbeitsmarkt- und Berufsforschung 114. Institut für Arbeitsmarkt- und Berufsforschung der Bundesanstalt für Arbeit, Nürnberg, pp.: 287-342.

Hu, W.-Y. (2000): Immigrant Earning Assimilation: Estimates from Longitudinal Data, in: *American Economic Review*, 90 (2): 368-372.

Hulka, B. S. and Wheat, J. R. (1985): Patterns of Utilization. The Patient Perspective, in: *Medical Care*, 23 (5): 438-60

Idler, E. L. and Benyamini, Y. (1997): Self-Rated Health and Mortality: A Review of Twenty-Seven Community Studies, in: *Journal of Health and Social Behaviour*, 38: 21-37.

Jäckle, R. (2007): Health and wages, Panel data estimates considering selection and endogeneity, in: *ifo Working Paper*, No. 43, Munich.

Jäger, T. and Rezo, J. (without year): Zur sozialen Strukture der bosnischen Kriegsflüchtlinge in der Bundesrepublik Deutschland, study on behalf of Arbeiterwohlfahrt Bundesverbande e.V et al.

Jasso, G., Massey, D. S., Rosenzweig, M. R. and Smith, J. P. (2004): Immigrant Health – Selectivity and Acculturation, in: Anderson, N. B., Bulatao, R. A. and Cohen, B. (eds.): Critical Perspectives on Racial and Ethnic Differences in Health and Late Life, Committee on Population, National Research Council, Washington DC, The National Academic Press, pp.: 227-266.

Jiménez-Martin, S., Labeaga, J. M. and Martinez-Granado, M. (2002): Latent class versus two-part models in the demand for physician services across the European Union, in: *Health Economics*, 11: 301-321.

Jones, A. M., Rice, N., Bago d'Uva, T. and Balia, S. (2007): *Applied Health Economics*, Routledge, London.

Jürges, H. (2007): Health insurance status and physician-induced demand for medical services in Germany: New evidence from combined district and individual data, in: *SOEP Papers on Multidisciplinary Panel Data Research at DIW Berlin*, No. 8, DIW, Berlin.

Jürges, H. (2005): Self-assessed health, reference levels, and mortality, *Discussion Paper*, University of Mannheim, Mannheim Research Institute for the Economics of Aging.

Kalter, F. (2000): Theorien der Migration, in: Müller, U., Nauck, B., Diekmann, A. (eds.): Handbuch der Demographie, Springer, Berlin.

Kalter, F. and Granato, N. (2007): Educational Hurdles on the Way to Structural Assimilation in Germany, in: Heath, A. F. and Yi Cheung, S. (eds.): Unequal Chances: Ethnic Minorities in Western Labour Markets,. Oxford: Oxford University Press, pp.: 269-317.

Kaplan, M. S. and Marks, G. (1990): Adverse Effects of Acculturation: Psychological Distress Among Mexican American Young Adults, in: *Social Science & Medicine*, 31: 1313-1319.

Kasl, S. V. and Berkman, L. (1983): Health Consequences of The Experiences of Migration, in: *Annual Review of Public Health*, 4: 69-90.

Kennedy, S. and McDonald, J. T. (2006): Immigrant health in the period after arrival in Australia, in: Cobb-Clark, D. A. and Khoo, S.-E. (eds.): *Public Policy and Immigrant Settlement*, Edward Elgar, Cheltenham, UK. Northhampton, USA, pp.: 149-174.

Kerkhofs, M. and Lindeboom, M. (1995): Subjective health measures and state dependent reporting errors, in: *Health Economics*, 4 (3): 221-235.

Khlat, M. and Darmon, N. (2003): Is there a Mediterranean migrants mortality paradox in Europe?, in: *International Journal of Epidemiology*, 32: 1115-1118.

King, R. (1986): Return migration and regional economic problems: An overview, in: King, R. (ed.): Return migration and regional economic problems, London et al., Croom Helm, pp.: 1-37.

Kogan, I. (2004): Last Hired, First Fired? The Unemployment Dynamics of Male Immigrants in Germany, in: *European Sociological Review*, 20 (5): 445-461.

Kohls, M. (2008a): Erfassungsfehler, Healthy-Migrant-Effect und andere Schwierigkeiten bei der Analyse der Mortalität von Migranten: Eine Bestandsaufnahme, in: *Working Paper 15*, Bundesamt für Migration und Flüchtlinge [Federal Office for Migration and Refugees], Nuremberg.

Kohls, M. (2008b): Leben Migranten wirklich länger? Eine empirische Analyse der Mortalität von Migranten in Deutschland, in: *Working Paper 16*, Bundesamt für Migration und Flüchtlinge [Federal Office for Migration and Refugees], Nuremberg.

Koos, E. L. (1954): *The Health of Regionville*. New York 1954.

Kristen, C., Reimer, D. and Kogan, I. (2008): Higher education entry of Turkish immigrant Youth in Germany, in: *International Journal of Comparative Sociology*, 49 (2-3): 127-151.

Kroh, M. (2005): Interviewеffekte bei der Erhebung des Körpergewichts in Bevölkerungsumfragen, in: *Das Gesundheitswesen*, 67: 646-655.

Kuepper-Nybelen, J., Lamerz, A., Bruning, N., Hebebrand, J., Herpertz-Dahlmann, B. and Brenner, H. (2005): Major differences in prevalence of overweight according to nationality in preschool children living in Germany: determinants and public health implications, in: *Archives of Disease in Childhood*, 90 (4): 359-363.

Kühnisch, J., Senkel, H. and Heinrich-Weltzien, R. (2003): Vergleichende Untersuchung zur Zahngesundheit von deutschen und ausländischen 8- bis 10-Jährigen des westfälischen Ennepe-Ruhr-Kreises, in: *Das Gesundheitswesen*, 65 (2): 96-101.

Kurthen, H. (1995): Germany at the crossroads: National Identity and the Challenges of Immigration, in: *International Migration Review*, 29 (4): 915-938.

LaLonde, R. J. and Topel, R. H. (1992): The Assimilation of Immigrants in the U.S. Labor Market, in: Borjas, G. J. and Freeman, R. B. (eds.): Immigration and the Work Force: Economic Consequences for the United States and Source Areas. Chicago: University of Chicago Press, pp.: 67-92.

Lambert, D. (1992): Zero-Inflated Poisson Regression, with an Application to Defects in Manufacturing, in: *Technometrics*, 34 (1): 1-14.

Lampert, T. and Kroll, L. E. (2005): Einfluss der Einkommensposition auf die Gesundheit und die Lebenserwartung, in: *DIW Discussion Paper*, No. 527, Berlin.

Lampert, T., Saß, A.-C., Häfelinger, M. and Ziese, T. (2005): Beiträge zur Gesundheitsberichterstattung des Bundes: Armut, soziale Ungleichheit und Gesundheit, Expertise des Robert Koch-Instituts zum 2. Armuts- und Reichtumsbericht der Bundesregierung, Robert Koch-Institut, Berlin.

Laroche, M. (2000): Health Status and Health Services Utilization of Canada's Immigrant and Non-Immigrant Populations, in: *Canadian Public Policy*, 26 (2): 51-75.

Lechner, I. and Mielck, A. (1998): Die Verkleinerung des "Healthy-Migrant-Effects": Entwicklung der Morbidität von ausländischen und deutschen Befragten im sozio-oekonomischen Panel 1984-1992, in: *Das Gesundheitswesen*, 60: 715-720

LeClere, F. B., Jensen, L. and Biddlecom, A. E. (1994): Health Care Utilization, Family Context, and Adaptation Among Immigrants to the United States, in: *Journal of Health and Social Behavior*, 35 (4): 370-384.

Le Grand, J. (1991): Equity and Choice. London: Harper Collins.

Le Grand, J. (1982): The Strategy of Equality: Redistribution and the Social Services, George Allen & Unwin, London.

Le Grand, J. (1978): The distribution of public expenditures: the case of health care, in: *Economica*, 45: 125-142.

Leu, R. E. and Gerfin, M. (1992): Die Nachfrage nach Gesundheit – Ein empirischer Test des Grossmann-Modells, in: Oberender, P. (ed.): *Steuerungsprobleme im Gesundheitswesen*, Nomos Verlagsgesellschaft, Baden-Baden, pp.: 61-78.

Lindstrom, M. and Sundquist, K. (2005): The impact of country of birth and time in Sweden on overweight and obesity: a population-based study, in: *Scandinavian Journal of Public Health*, 33(4): 276-284.

Lindert, J. (2003): Krankheit kennt keine Papiere, in: Beautragte der Bundesregierung für Migranten und Flüchtlinge (eds.): Bundesweiter Arbeitskreis Migration und öffentliche Gesundheit, Gesunde Integration, Dokumentation der Fachtagung, 20th/21st February 2003, Berlin/Bonn, pp.: 143-147.

Mackenbach, J. (2005): Health Inequalities: Europe in Profile, Erasmus MC, University Medical Center Rotterdam.

Mackenbach, J. (2003): New Perspectives on Socio-economic Inequalities in Health, in: *Perspectives in Biology and Medicine*, 46 (3): 428-444.

Manning, W. G., Newhouse, J. P., Duan, N., Keeler, E. B., Leibowitz, A. and Marquis, M. S. (1987): Health insurance and the demand for medical care: evidence form a randomized experiment, in*: American Economic Review*, 77: 251-277.

Markides, K. S. and Coreil, J. (1986): The health of Southwestern Hispanics: An epidemiologic paradox, in: *Public Health Reports*, 101 (3): 253–65.

Marmot, M. G. and Syme, S. L. (1976): Acculturation and Coronary heart disease in Japanese Americans, in: *American Journal of Epidemiology*, 104 (3): 225-247.

Marmot, M. G., Adelstein, A. M. and Bulusu, L. (1984): Lessons from the study of immigrant mortality, in: *The Lancet*, 1 (8392): 1455-1457.

Marmot M. G., Smith, G. D., Stansfeld, S., Patel, C., North, F., Head, J., White, I., Brunner, E. and Feeney, A. (1991): Health inequalities among British civil servants: the Whitehall II study, in: *The Lancet*, 337: 1387-1393.

Massey, D. and Constant, A. (2001): Guestworkers of the 1980's and 1990's: Who is Going Back and Who is Staying in Germany?, Paper prepared for the 2001 meeting of the European Society of Population Economics, in Athens, Greece, June 14-17, 2001.

Mattes, M. (2005): Gastarbeiterinnen in der Bundesrepublik. Anwerbepolitik, Migration und Geschlecht in den 50er bis 70er Jahren, Campus Verlag, Frankfurt, New York.

McDonald, J. T. (2006): The Health Behaviour of Immigrants and Native-Born People in Canada, *Working Paper Series No 01-06, - Atlantic Metropolis Centre*.

McDonald, J. T. and Kennedy, S. (2005): Is migration to Canada associated with unhealthy weight gain? Overweight and obesity among Canada's immigrants', in: *Social Science & Medicine*, 61 (12): 2469-2481.

McDonald, J. T. and Kennedy, S. (2004): Insights into the 'healthy immigrant effect': health status and health service use of immigrants to Canada, in: *Social Science & Medicine*, 59 (8): 1613-1627.

McMichael, A. J. (1976): Standardized mortality ratios and the "healthy worker effect": scratching beneath the surface, in: *Journal of Occupational Medicine*, 18: 165-168.

Mehle, J. (1981): Evaluation der deutschsprachigen medizinischen Literatur von 1962 bis 1979 über die Epidemiologie und die Konfliktfelder im Gesundheitsverhalten ausländischer Arbeitnehmer in der Bundesrepublik. Dissertation. Bochum.

Mielck, A. (2000): *Soziale Ungleichheit und Gesundheit. Empirische Ergebnisse, Erklärungsansätze. Interventionsmöglichkeiten* Bern: Hans Huber.

Mooney, G. (1983): Equity in health care: confronting the confusion, in: *Effective Health Care*, 1: 179-185.

Morris, S., Sutton, M. and Gravelle, H. (2005): Inequity and inequality in the use of health care in England: an empirical investigation, in: *Social Science & Medicine*, 60: 1251-1266.

Moulton, B. R. (1990): An Illustration of a Pitfall in Estimating the Effects of Aggregate Variables on Micro Unit, in: *The Review of Economics and Statistics*, 72: 334-38.

Mullahy, J. (1986): Specification and testing in some modified count data models, in: *Journal of Econometrics*, 33 (3): 341-365.

Mundlak, Y. (1978): On the Pooling of Time Series and Cross Section Data, in: *Econometrica*, 46 (1): 69-85.

Murray, C. J .L., Tandon, A., Salomon, J. and Mathers, C. D. (2001): Enhancing cross-population comparability of survey results, in: *GPE Discussion Paper*, No. 35, WHO/EIP.

Muurinen J. (1982): Demand for Health, a Generalised Grossman Model, in: *Journal of Health Economics*, 1: 5-29

Newbold, K. B. (2006): Chronic conditions and the Healthy Immigrant Effect: Evidence from Canadian Immigrants, in: *Journal of Ethnic and Migration Studies*, 32 (5): 765-784.

Newbold, B. K. (2005a): Self-rated health within the Canadian immigrant population: risk and the healthy immigrant effect, in: *Social Science & Medicine*, 60: 1359-1370.

Newbold, B. K. (2005b): Health Status and Health Care Utilization of the Foreign-Born in Canada: A Longitudinal Analysis, 1994/95-2000/01, in: *Journal of Health Research Services and Policy*, 10 (2): 77-83.

Newbold, K. B. and Danforth, J. (2003): Health status and Canada's immigrant population, in: *Social Science & Medicine*, 57 (10): 1981-1995.

Ng, E., Wilkins, R., Gendron, F. and Berthelot, J.-M. (2005): Dynamics of immigrants' health in Canada: Evidence from the National Population Health Survey. Ottawa: Statistics Canada. Catalogue No. 82-618-MWE2005002. Available online: http://www.statcan.ca/english/research/82-618-MIE/2005002/pdf/82-618-MIE2005002.pdf (accessed on: 18th January 2008).

Oberwöhrmann, S. and Bettge, S. (2007): Basisdaten zur gesundheitlichen und sozialen Lage von Kindern in Berlin – Ergebnisse auf der Basis der Einschulungsuntersuchungen 2005, Gesundheitsberichterstattung Berlin, Spezialbericht 2007-1. Berlin: Senatsverwaltung für Gesundheit, Soziales und Verbraucherschutz.

O'Donnell, O. and Propper, C. (1991): Equity and the distribution of UK National Health Service resources, in: *Journal of Health Economics*, 10: 1-19.

OECD (2007): Health at a Glance, OECD Indicators, 3-1. Tobacco consumption. Available online: http://masetto.sourceoecd.org/vl=2340271/cl=28/nw=1/rpsv/health2007/g3-1-02.htm. (accessed on: 3rd September 2008).

Oliver, A. and Mossialos, E. (2004): Equity of access to health care: outlining the foundations for action, in: *Journal of Epidemiology and Community Health*, 58: 655-658.

Ossiander, E. M., Emanuel, I., O'Brien, W. and Malone, K. (2004): Driver's licenses as a source of data on height and weight, in: *Economics and Human Biology*, 2: 219-227.

Pablos-Méndez, A. (1994): A letter to the editor, in: *JAMA*, 271: 1237-1238.

Palloni, A. and Morenoff, J. (2001): Interpreting the paradoxical in the Hispanic paradox – demographic and epidemiologic approach, in: Weinstein, M., Hermalin A. I. and Stoto, M. A. (eds.): Population Health and Aging – Strengthening the Dialogue between Epidemiology and Demography, New York, The New York Academy of Science, pp.: 140-174.

Palo, de D., Faini, R. and Venturini, A. (2005): The social assimilation of immigrants, in: *IZA Discussion Paper*, No. 2439, Institute for the Study of Labor (IZA), Bonn.

Parkin, D. M., Bray, F., Ferlay, J, and Pisani, P. (2005): Global Cancer Statistics, 2002, in: *CA: A Cancer Journal for Cliniciancs*, 55: 74-108.

Pechansky, R. and Thomas, W. (1981): The concept of access, in: *Medical Care*, 19: 127-140.

Pereira, J. (1993): What does Equity in health mean?, in: *Journal of Social Policy*, 22: 19-48.

Pérez, C. E. (2002): Health Status and Health Behaviour among immigrants, *Supplement to Health Reports*, 13, Statistics Canada, Catalogue 82-003.

Pethe, H. (2006): Internationale Migration hoch qualifizierter Arbeitskräfte. Die Greencard-Regelung in Deutschland, Deutscher Universitätsverlag, Wiesbaden.

Plümper, T. and Troeger, V. E. (2007): Efficient estimation of time-invariant and rarely changing variables in finite sample panel analyses with unit fixed effects, in: *Political Analysis*, 15: 124-39.

Pohl, C. (2005): Return Migration of Low- and High-Skilled Immigrants from Germany, IFO Institut, Dresden.

Pohlmeier, W. and Ulrich, V. (1995): An Econometric Model of the Two-Part Decision-making Process in the demand for health care, in: *Journal of Human Resources*, 30 (2): 339-361.

Pol, L. G. and Thomas, R. K. (1992): The demography of health and health care, Plenum Press, New York.

Rabash, J., Steele, F., Browne, W. and Prosser, B. (2005): A User's Guide to MLwiN Version 2.0, Centre for Multilevel Modelling, University of Bristol.

Rabe-Hesketh, S. and Skrondal, A. (2008): Multilevel and Longitudinal Modeling Using Stata, 2nd edition, Stata Press.

Ravenstein, E. G. (1885): The laws of migration, in: *Journal of the Royal Statistical Society*, 48: 167-227.

Razum, O. (2001): Der Healthy-migrant-Effekt in Epidemiologie und öffentlicher Gesundheitspflege, Habilitation, Heidelberg.

Razum, O. and Rohrmann, S. (2002): The healthy migrant effect: role of selection and late entry bias, in: *Das Gesundheitswesen*, 64: 82-88.

Razum, O., Sahin-Hodoglugil, N. and Polit, K. (2005): Health, wealth, or family ties? Why Turkish work migrants return from Germany. Qualitative studies with re-migrants in Turkey, in: *Journal of Ethnic and Migration Studies*, 31: 719-739.

Razum, O. and Twardella, D. (2004): Niedrige Sterblichkeit von Migranten – wirklich ein Paradox?, in: Krämer. A. and Prüfer-Krämer, L. (eds.): Gesundheit von Migranten. Internationale Bestandsaufnahme und Perspektiven, Weinheim und München, Juventa, pp.: 61-74.

Razum, O., Zeeb, H. and Akgün, S. H. (1998): Low overall mortality of Turkish residents in Germany persists and extends into a second generation: merely a healthy migrant effect?, in: *Tropical Medicine and International Health*, 3 (4): 297-303.

Razum, O., Zeeb, H., and Rohrmann, S. (2000): The ‚healthy migrant effect' – not merely a fallacy of inaccurate denominator figures, in: *International Journal of Epidemiology,* 29: 191-192.

Richter, M. (2005): Gesundheit und Gesundheitsverhalten im Jugendalter: Der Einfluss sozialer Ungleichheit. Wiesbaden: VS-Verlag.

Riphahn, R. T., Wambach, A. and Million, A. (2003): Incentive Effects in the Demand for Health Care: A Bivariate Panel Count Data Estimation, in: *Journal Applied Econometrics*, 18: 387-405.

Robert-Koch-Institut (RKI) (2008): Schwerpunktbericht: Migration und Gesundheit. Berlin: Robert-Koch-Institut.

Ronellenfitsch, U., Kyobutungi, C., Becher, H. and Razum, O. (2006): All-cause and Cardiovascular mortality among ethnic German immigrants from the Former Soviet Union: a cohort study, in: *BMC Public Health*, **6**: 16.

Ronellenfitsch, U. and Razum, O. (2004): Deteriorating health satisfaction among immigrants from Eastern Europe in Germany, in: *International Journal for Equity in Health*, 3 (4).

Rottem, M., Szyper-Kravitz, M. and Shoenfeld, Y. (2005): Atopy and asthma in migrants, in: *International Archives of Allergy and Immunology*, 136 (2): 198-204.

Rubalcava, L. N., Teruel, G. M., Thomas, D. and Goldman, N. (2008): The Healthy Migrant Effect: New Finding From the Mexican Family Life Survey, in: *American Journal of Public Health*, 98 (1): 78-84.

Santos Silva, J. M. C. and Windmeijer, F. (2001): Two-Part Multiple Spell Models for Health Care Demand, in: *Journal of Econometrics*, 104 (1): 67-89.

Schellhorn, M. (2002): The Demand for Health Care, Swiss Evidence, dissertation.de – Verlag im Internet, Berlin.

Schenk, L. (2007): Migration und Gesundheit – Entwicklung eines Erklärungs- und Analysemodells für epidemiologische Studien, in: *International Journal of Public Health*, 52: 87-96.

Schmidt, C. M. (1994): The Country of Origin, Family Structure and Return Migration of Germany's Guest-Workers, in: *Vierteljahrshefte zur Wirtschaftsforschung*, 63 (1): 119-125.

Schwarze, J. (2003): Using Panel Data on income satisfaction to estimate equivalence scale elasticity, in: *Review of Income and Wealth*, 49 (3): 359-372.

Schwarze, J., Andersen, H. A. and Anger, S. (2000): Self-related health and changes in self-related health as predictor of mortality – First evidence from German panel data, in: *DIW Discussion Paper*, No. 203, Berlin.

Schwarzer, R. (1996): Psychologie des Gesundheitsverhaltens, 2nd edition, Göttingen.

Scribner, R. (1996): Editorial: Paradox as paradigm – the health outcomes of Mexican Americans, in: *American Journal of Public Health*, 86 (3): 303-305.

Scribner, R. and Dwyer, J. H. (1989): Acculturation and low birthweight among Latinos in the Hispanic HANES, in: *American Journal of Public Health*, 79: 1263-1267.

Skrondal, A. and Rabe-Hasketh, S. (2004): Generalized Latent Variable Modeling, Interdisciplinary Statistics Series. Chapman & Hall, Boca-Raton.

Seidenstücker, S. (2002): Das Gesundheitsverhalten von Migranten in Deutschland – eine explorative Analyse, Dissertation.

Seifert W. (1995): *Die Mobilität der Migranten. Die berufliche, ökonomische und soziale Stellung ausländischer Arbeitnehmer in der Bundesrepublik.* Edition Sigma, Berlin.

Shaw, M., Dorling, D. and Smith, G. D. (1999): Poverty, Social Exclusion, and Minorities" in Marmot, M. and Wilkinson, R. G. (eds.): *Social Determinants of Health*, Oxford University Press, New York.

Singh, G.K. and Siapush, M. (2002): Ethnic-Immigrant Differentials in Health Behaviors, Morbidity, and Cause-Specific Mortality in the United States: An Analysis of Two National Data Bases, in: *Human Biology*, 74 (1): 83-109.

Sjaastad, L. (1962): The Costs and Returns of Human Migration, in: *Journal of Political Economy*, 70, Supplement: 80-93.

Smaje, C. and Grand, J. L. (1997): Ethnicity, equity and the use of health services in the British NHS, in: *Social Science & Medicine*, 45: 485-96.

Snijders, T. and Bosker, R. (1999): Multilevel Analysis: An introduction to basic and advanced multilevel modelling, London: Sage.

SOEP Group (2001): The German Socio-Economic Panel (SOEP) after more than 15 years – Overview, in: Holst, E., Dean, L. R. and DiPrete, T. A. (eds.): Proceedings of the 2000 Fourth International Conference of German Socio-Economic Panel Study Users (SOEP2000), in: *Vierteljahrshefte zur Wirtschaftsforschung*, 70 (1): 7-14.

Spallek, J. and Razum, O. (2008): Gleich und gerecht? Erklärungsmodelle für die gesundheitliche Situation von Migrantinnen und Migranten, in: Bauer, U., Bittlingmayer, U. H. and Richter, M. (eds.): Health Inequalities. Determinanten und Mechanismen gesundheitlicher Ungleichheit. VS Verlag für Sozialwissenschaften: Wiesbaden.

Spieß, M. and Kroh, M. (2004): Documentation of Sample Sizes and Panel Attrition in the German Socio-Economic Panel (SOEP) 1984-2003, in: *Research Notes* No. 28a, DIW, Berlin.

Stark, O. and Bloom, D. E. (1985): The New Economics of Labor Migration, in: *American Economic Review*, 75: 173-178.

Stark, O., Helmenstein, C. and Yegorov, Y. (1997): Migrants' savings, purchasing power parity, and the optimal duration of migration, in: *International Tax and Public Finance*, 4: 307–324.

Steiner, V. and Velling, J. (1994): Re-Migration Behaviour and Expected Duration of Stay of Guest Workers in Germany, in: Steinmann, G. (ed.): The Economic Consequences of Immigration to Germany, Heidelberg, Physica-Verlag, pp. 101-119.

Steinkamp, G. (1993): Soziale Ungleichheit, Erkrankungsrisiko und Lebenserwartung. Kritik der sozialepidemiologischen Ungleichheits-forschung, in: *Sozial- und Präventivmedizin*, 38: 111-122.

Stephen, E. H., Foote, K., Hendershot, G. E., and Schoenborn, C. A. (1994): Health of the Foreign-Born Population, in: *Advance Data from Vital and Health Statistics,* 241: 1-10.

Stronks, K., Ravelli, A. C. J. and Reijneveld, S. A. (2001): Immigrants in the Netherlands: Equal Access for equal needs?, in: *Journal of Epidemiology and Community Health*, 55: 701-707.

Sundby, A. and Petersen, P. E. (2003): Oral health status in relation to ethnicity of children in the Municipality of Copenhagen, Denmark, in: *International Journal of Paediatric Dentristy*, 13 (3): 150-157.

Sundquist, J. (1995): Living Conditions and Health: A Population-Based Study of Labour Migrants and Latin American Refugees in Sweden and Those Who Were Repatriated, in: *Scandinavian Journal of Primary Health Care*, 13 (2): 128-134.

Sutton, M. (2002): Vertical and horizontal aspects of socio-economic inequity in general practitioner contacts in Scotland, in: *Health Economics*, 11 (6): 537-549.

Swallen, K. C. (1997): Do health selection effects last? A comparison of morbidity rates for elderly adult immigrants and US-born elderly persons, in: *Journal of Cross-Cultural Gerontology*, 12: 317-339.

Szczepura, A. (2005): Access to health care for ethnic minority populations, in: *Postgraduate Medical Journal*, 81: 141-147.

Taani, D. Q. (2002): Relationship of socio-economic background to oral hygiene, gingival status, and dental caries in children, in: *Quintessence*, 33 (3): 195-198.

Thode, N., Bergmann, E., Kamtsiuris, P. and Kurth, B.-M. (2004): Einflussfaktoren auf die Inanspruchnahme des deutschen Gesundheits-wesens und mögliche Steuerungsmechanismen, Schlussbericht, RKI, Berlin.

Tiesmeyer, K., Brause, M., Lierse, M., Lukas-Nülle, M. and Hehlmann, T. (2007): Der blinde Fleck: Ungleichheiten in der Gesundheitsversorgung. Bern: Huber.

Treibel, A. (1999): Migration in modernen Gesellschaften. Soziale Folgen von Einwanderung, Gastarbeit und Flucht. Juventa Verlag, München.

Uebelmesser, S. (2005): To Go or not to Go: Emigration from Germany, in: *CESifo Working Paper*, No. 1626.

Uitenbroek, D. G. and Verhoeff, A. P. (2002): Life Expectancy and mortality differences between migrant groups living in Amsterdam, the Netherlands, in*: Social Science & Medicine,* 54: 1379-1388.

Ulrich, R. E. (1998): Grau oder bunt? Zuwanderung und Deutschlands Bevölkerung im Jahre 2030, in: David, M., Borde, T. and Kentenich, H. (eds.): Migration und Gesundheit: Zustandsbeschreibung und Zukunftsmodelle, Mabuse-Verlag: Frankfurt am Main, pp.: 17-32.

Van Doorslaer, E. and Wagstaff, A. (1997): Income-related inequalities in health: some international comparisons, in: *Journal of Health Economics*, 16 (1): 93-112.

Van Doorslaer, E., Koolman, X. and Jones, A. (2004): Explaining income-related inequalities in doctor utilisation in Europe, in: *Health Economics*, 13 (7): 629-647.

Van Doorslaer, E., Wagstaff, A., Calonge, S., Christiansen, T., Gerfin, M., Gottschalk, P., Janssen, R., Lachaud, C., Leu, R. E., Nolan, B., O'Donnell, O., Paci, P., Pereira, J., Pinto, C. G., Propper, C., Reñé, J., Rochaix, L., Rodriguez, M., Rutten, F., Upward, R. and Wolfe, B. (1992): Equity in the Delivery of Health Care: some cross-country comparisons, in: *Journal of Health Economics*, 11 (4): 389-411.

Van Doorslaer, E., Wagstaff, A., Bleichrodt, H., Calonge, S., Gerdtham, U.-G., Gerfin, M., Geurts, J., Gross, L., Häkkinen, U., Leu, R. E., O'Donnell, O., Propper, C., Rodriguez, M., Sundberg, G., Winkelhake, O. (1997): Income-related inequalities in health: some international comparisons, in: *Journal of Health Economics*, 16 (1): 93-112.

Van Doorslaer, E., Wagstaff, A., van der Burg, H., Christiansen, T., De Graeve, D., Duchesne, I., Gerdtham, U.-G., Gerfin, M., Geurts, J., Gross, L., Häkkinen, U., John, J., Klavus, J., Leu, R. E., Nolan, B., O'Donnell, O., Propper, C., Puffer, F., Schellhorn, M., Sundberg, G.,Winkelhake, O. (2000): Equity in the delivery of health care in Europe and the US, in: *Journal of Health Economics*, 19 (5): 553-583.

Van Ourti, T. (2004): Measuring horizontal inequity in Belgian health care using a Gaussian random effects two part count data model, in: *Health Economics*, 13: 705-724.

Van Steenkiste, M. (2003): Zahngesundheitliches Verhalten bei deutschen und türkischen Vorschulkindern, in: *Oralprophylaxe*, 25 (3): 121-128.

Vega, W. and Amaro, H. (1994): Latino Outlook: Good Health, Uncertain Prognosis, in: *Annual Review of Public Health*, 15: 39-67.

Velling, J. (1994): The Determinants of family reunification among German-Guest-Workers, Proceedings of the 1993 International Conference of SOEP Users, in: *Vierteljahrshefte zur Wirschaftsforschung*: 126-132.

Vickery, D. M. and Lynch, W. D. (1995): Demand Management: Enabling Patients to Use Medical Care Appropriately, in: *Journal of Occupational and Environmental Medicine*, 37 (5): 551-557.

Wagner, G. G., Frick, J. and Schupp, J. (2007): The German Socio-Economic Panel Study (SOEP) – Scope Evolution and Enhancements, in: *Schmollers Jahrbuch*, 127 (1): 139-169.

Wagner, G. G., Burkhauser, R. V. and Behringer, F. (1993): The English Language Public Use File of the German Socio-Economic Panel, in: *Journal of Human Resources*, 28: 429-33.

Wagner, G. G., Büchel, F., Haisken-DeNew, J. P. and Spiess, C. K. (1998): Education as a Keystone of Integration of Immigrants: Determinants of School Attainment of Immigrant Children in West Germany, in: Kurthen, H., Fijalkowski, J. and Wagner, G. G. (eds.): Immigration, Citizenship and the Welfare State in Germany and the United States: Immigrant Incorporation,. Stamford, CT: Jai Press, pp.: 35-45.

Wagstaff, A. (1986): The demand for health – Some new empirical evidence, in: *Journal of Health Economics*, 5: 195-233.

Wagstaff, A. and van Doorslaer, E. (2000a): Measuring and testing for inequity in the delivery of health care, in: *Journal of Human Resources*, 35 (4): 716-733.

Wagstaff, A. and van Doorslaer, E. (2000b): Equity in Health Care Finance and Delivery, in: Culyer, A. J. and Newhouse, J. P. (eds.): Handbook of Health Economics, Elsevier Science B. V., Amsterdam, Chapter 34.

Wagstaff, A. and van Doorslaer, E. (1993): Equity in the finance and delivery of health care: concepts and definitions, in: Van Doorslaer, E., Wagstaff, A. and Rutten, F. (eds.): Equity in the Finance and Delivery of Health Care: an international perspective, Oxford Medical publications, Oxford University press, New York, p. 7-19.

Wagstaff, A., van Doorslaer, E. and Paci, P. (1991): On the measurement of horizontal inequity in the delivery of health care, in: *Journal of Health Economics*, 10 (2): 169-205.

Weinstein, M., Hermalin, A. I. and Stoto, M. A. (2001): Population Health and Aging – Strengthening the Dialogue between Epidemiology and Demography, New York, The New York Academy of Science.

Weitoft, G. R., Gullberg, A., Hjern, A. and Rossen, M. (1999): Mortality statistics in immigrant research, method for adjusting underestimation of mortality, in: *International Journal of Epidemiology*, 28: 756-763.

Werner, H. (2001): From Guests to Permanent Stayers? – From the German "Guestworker" Programmes of the Sixties to the Current "Green-Card" Initiative for IT Specialists, in: IAB Labour Market Research Topics, No. 43, Insitute of Employment Research, Nurenberg (Germany).

Will, B., Zeeb, H. and Baune, B. T. (2005): Overweight and obesity at school entry among migrant and German children: a cross-section study, in: *BMC Public Health*, 5 (45).

Williams, A. (1993): Equity in health care: The role of ideology, in: Van Doorslaer, E., Wagstaff, A. and Rutten, F. (eds.): Equity in the Finance and Delivery of Health Care: an international perspective, Oxford Medical publications, Oxford University press, New York, p. 287-319.

Williams, A. and Cookson, R. (2000): Equity in health, in: Culyer, A. J. / Newhouse, J. P. (eds.): Handbook of Health Economics, Elsevier Science B. V., Amsterdam, Chapter 35.

Windorfer, A. and Bruns-Philipps, E. (2002): Präventive Maßnahmen: Kinder ausländischer Herkunft benachteiligt, in: *Kinderärztliche Praxis*, 4: 258-264.

Wingate, M. S. and Alexander, G. R. (2006): The healthy migrant theory: variations in pregnany among US-born migrants, in: *Social Science & Medicine*, 62: 491-498.

Winkelmann, R. (2004): Health Care Reforms and the number of doctor visits – an econometric analysis, in: *Journal of Applied Econometrics*, 19: 455-472.

Winkelmann, R. (2000): *Econometric Analysis of Count Data*, 3rd edition, Springer, Berlin.

Winkelmann, L. and Winkelmann, R. (1998): Why are the unemployed so unhappy?, in: *Economica*, 65: 1-15.

Wooldridge, J. M. (2002): *Econometric Analysis of Cross Section and Panel Data*, MIT Press, Cambridge.

World Health Organisation (WHO) (1992): Ziele zur Gesundheit für alle. Die Gesundheitspolitik für Europa. Aktualisierte Zusammenfassung.

World Health Organisation (1948): WHO definition of health, online: http://www.who.int/about/definition/en/print.html, (accessed on: 30th September, 2007).

Wu, Z. and Schimmele, C. M. (2006): The Healthy Migrant Effect on Depression: Variation Over Time?, in: *Canadian Population Studies*, 33 (2): 271-295.

Wu, Z. and Schimmele, C. M. (2005): Health Care Utilization of Later-Stage Immigrants in British Columbia, in: *Research on Immigration and Integration in the Metropolis (RIIM) Working Paper Series*, No. 05-15, Vancouver Centre of Excellence.

Yamaguchi, K. (1991): Event History Analysis, Sage Publ., Newbury Park.

Zimmermann, K. F. (1999): Ethnic German Migration since 1989 - Results and Perspectives“, in: *IZA Discussion Paper*, No. 50, Institute for the Study of Labor (IZA), Bonn.

Zeeb, H., Razum, O., Blettner, M. and Stegmaier, C. (2002): Transition in cancer patterns among Turks residing in Germany, in: *European Journal of Cancer*, 38: 705-711.

Zweifel, P. (1982): Ein ökonomisches Modell des Arztverhaltens, Springer, Berlin.