On the move: Analyzing immigration determinants and immigrant outcomes

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On the move: Analyzing immigration determinants and immigrant outcomes

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en uitkomsten voor immigranten

(met een samenvatting in het Nederlands)

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Promotoren: Prof. dr. B. Unger

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To my parents

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Now that this rewarding and stressful dissertation journey has come to an end, I look back at four years of development, struggles, enjoyment and successes. The coming pages are the product of this journey and I hope you will enjoy reading this thesis.

Swantje Falcke

Utrecht, February 2017

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Nomenclature

EU	European Union
FAMO	Fachkräftemonitoring
FE	Fixed effects
GDP	Gross domestic product
GPA	Grade point average
IAB	Institute for Employment Research
ILO	International Labour Organization
ISCO	International Standard Classification of Occupations
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary least squares
OWW	Occupational Wages around the World
ROA	Dutch Research Center for Education and Labor Market
USA	United States of America
WIFO	Austrian Institute of Economic Research

Chapter 1

Introduction

In 2015 more than 240 million people lived outside their country of birth, which accounts for 3.3 percent of the world's population (United Nations, 2015). The share of immigrants living in Europe increased from 6.8 percent in 1990 to 10.3 percent in 2015. A similar trend is visible in North America, where the share of immigrants increased in the same time from 9.8 percent to 15.2 percent (United Nations, 2015).

Given the increased number of immigrants worldwide, the determinants of immigration and the social and economic integration of immigrants into the countries of destination are of particular importance.

Even though Adam Smith already economically analyzed migration, concluding that "(...)a man is of all sorts of luggage the most difficult to be transported." (Smith, 1776), it has only been in the last decades that international migration has received considerable attention as part of economic research.[1] Most economic research on international migration is based on the human capital approach by Sjaastad (1962). According to his theory people decide whether to immigrate or not with the aim of maximizing the present value of their lifetime earnings (see e.g. Todaro, 1969; Borjas, 1989). Accordingly, people decide to immigrate if the earnings in the country of destination subtracted by the costs of moving exceed the earnings in the country of origin. While theoretical models on the human capital approach explain why immigration occurs, more recent theories aim at dynamic models, which explain why immigration continues or return migration occurs (Adda et al., 2006; Nekby, 2006; Bijwaard, 2010; Constant and Zimmermann, 2012). Empirical studies on the determinants of immigration and

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[1]It should be noted that, while the empirical literature distinguishes between international and internal migration, economic theory still treats them equally (Bodvarsson and Van den Berg, 2013).

immigrant outcomes are still scarce (Bodvarsson and Van den Berg, 2013), which is partially due to the lack of data availability on international migration.

My contributions address the *determinants of immigration* by looking at the role of welfare generosity differences between the country of origin and the country of destination (chapter 2) and the role of family ties as determinants of mobility intentions (chapter 3) and *immigrant outcomes* by studying ethnic penalties in labor market outcomes of second generation immigrants (chapter 4).

In this introductory chapter, I first provide a definition of the type of immigration that is used throughout this dissertation and contrast it with other forms of immigration. This is followed by a sketch of the modern history of immigration and recent trends in immigration. In the final part of this introduction, I provide an overview of the dissertation.

1.1   Types of immigration

In this dissertation, *immigrants* are defined as people who move across national borders to settle in another country. They voluntarily decide to move and can, given the migration policy of the country of destination, decide to which country they want to move. Immigrants who relocate across borders in search of a job or other economic opportunities are often referred to as *economic immigrants* (Constant and Zimmermann, 2013). However, the term can be misleading since economic immigrants may also move due to non-economic reasons (e.g. climate differences). Throughout the dissertation, I therefore refer to them as *immigrants*.

Two other kinds of immigration should be particularly distinguished from the type of immigrants analyzed in this book. Firstly, the group of *asylum seekers and refugees*. These people move abroad due to threats to their safety and well-being in their country of origin (Bodvarsson and Van den Berg, 2013). Their migration decision is neither voluntarily nor planned nor based on economic considerations (Dustmann et al., 2016). This group can therefore not be equated with immigrants studied in this dissertation.[2] Secondly, this dissertation does not cover *unauthorized immigration*, which concerns people who immigrate even though this is in violations with the laws and migration policies of the country of destination (Bodvarsson and Van den Berg, 2013). Even though their motivation to immigrate might

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[2]An overview of the research on the economics of refugee migration is provided in Dustmann et al. (2016).

be the same as of immigrants studied in this dissertation, they have to be analyzed separately as, by not following legal procedures of the destination country, they are in a unique legal situation (Bodvarsson and Van den Berg, 2013).

1.2   Modern history of immigration

The modern history of immigration can be characterized by different phases. Massey et al. (1999) and Massey (2003) divide the modern history of immigration, starting in 1500, into four different periods.[3]

The first period, which lasted from 1500 to 1800, was the *mercantile period.* Due to colonization and economic growth under mercantile capitalism, Europeans moved to the Americas[4], Africa, Asia and Oceania (Massey et al., 1999; Massey, 2003). Most immigrants were agrarian settlers; some others were (in descending order of frequency) administrators and artisans, entrepreneurs who founded plantations, and convicts sent to penal colonies overseas (Massey, 2003; Ferrie and Hatton, 2015). Next to immigrants originating from Europe, more than ten million African slaves were imported to the Americas to work on the plantations of European entrepreneurs. At the beginning of the 19th century slave imports were stopped in the United States of America (USA) as well as in many European countries (Ferrie and Hatton, 2015).

The second period, the *industrial period*, lasted from 1800 to the beginning of the 20th century and was caused by the industrialization and the accompanying economic development in Europe and its spread to some former colonies (Hatton and Williamson, 1998). From 1800 to 1925 almost 50 million Europeans, which amounted to about 12 percent of the European population at that time, immigrated from the developed countries of Europe to the Americas and Oceania hoping to find better living standards. Immigration during the industrial period was the first wave of immigration responding to economic globalization with its significant flows of capital and goods across continents. 85 percent of the immigrants went to just five destination countries; namely Argentina, Australia, Canada, New Zealand and the USA (Massey, 2003).

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[3]In this section, the overview of the modern history of immigration refers to the so-called Greater Atlantic economy. At the same time migration to and within Asia also made up for a substantial amount of immigration. See Ferrie and Hatton (2015) for an overview on the most important streams of Asian immigration before the start of the post-industrial migration.

[4]The Americas comprise of North America, Central America and South America.

The third period which started with the outbreak of World War I and lasted till the 1960s, was a *period of limited migration* (Massey et al., 1999). When immigration revived in the 1920s, most countries, and in particular the USA, had introduced restrictive migration policies as a response to increasing migration during the industrial period (Ferrie and Hatton, 2015). Apart from some movements of return migration, immigration stopped in the 1930s and the 1940s due to World War II. Occuring immigration was dominated by refugees and displaced persons (Massey, 2003).

The *period of post-industrial migration* started in the 1960s and marked the time at which immigration became a truly global issue (Massey et al., 1999). While immigration before was characterized by movements from populated to unsettled regions, post-industrial migration originated from less developed to developed countries (Castles and Miller, 2003). The variety of countries of origin as well as countries of destination increased enormously.

Since 1960 the composition of countries of origin and destination changed. Western Europe changed from being one of the main regions of origin to a main region of destination, while the reverse happened to Latin America (Ferrie and Hatton, 2015). Restrictive migration policies spread increasingly over several countries of destination, which suppressed a vast amount of potential immigration that could have taken place (Chiswick and Hatton, 2002). At the same time, the Schengen agreement, which was signed in 1985, allows unrestricted movement within the European Union.

1.3   Trends in immigration

Figures 1.1 and 1.2 show the stock of people living outside their country of birth in total numbers as well as in percentages of the population in the country of destination. While some differences between the two figures exist, they both illustrate that immigrants are highly concentrated in Europe, North America, Australia, and New Zealand; and much less so in South America, Africa, and Asia. This corresponds with the development in the past decades, described in section 1.2, where Western European countries turned into main countries of destination and a reverse development in South America.

The following graphs show the trends in immigrant stocks by (1) degree of development of countries, (2) continents and (3) within Europe.

Figure 1.3 shows the percentage of people living outside their country of birth. The figure illustrates the development of this percentage over time

Figure 1.1: Stock of immigrants in 2015

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.
Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.
Chagos Archipelago/Diego Garcia - Appears without prejudice to the question of sovereignty
A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas)
Final boundary between the Republic of the Sudan and the Republic of South Sudan has not yet been determined.
Final status of the Abyei area is not yet determined.

Source: United Nations (2015)

Figure 1.2: Immigrants in percentages of the population in 2015

40 per cent or over
20 to less than 40 per cent
15 to less than 20 per cent
10 to less than 15 per cent
5 to less than 10 per cent
2 to less than 5 per cent
Less than 2 per cent
No data

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.
Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.
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Source: United Nations (2015)

Figure 1.3: Immigrant stock (% of total population), by development of regions

Source: United Nations (2015)

Figure 1.4: Immigrant stock (% of total population), by continent

Source: United Nations (2015)

for the world in total as well as for developed regions, developing regions, less developed regions, and least developed regions. First of all, the figure illustrates that the percentage of people worldwide living outside their country of birth is rather stable over time, amounting to around 3 percent between 1990 and 2015. The graph also shows particular immigration trends over the past 25 years. The percentage of immigrants living in the developing regions of the world is steadily increasing from 7.2 percent in 1990 to 11.2 percent in 2015. While the share of immigrants living in the developing and less developed regions remained rather stable, the percentage of immigrants living in the least developed countries dropped by half between 1990 to 2015. It has to be noted, however, that the absolute number of people living abroad increased for all regions. While the number of individuals worldwide living outside their country of birth amounted to 153 million in 1990, it rose to 244 million in 2015 (United Nations, 2015). Thus, the difference in the trends seen in figure 1.3 is partially due to differences in the population growth of particular regions. While immigration during the mercantile and industrial period hugely consisted of immigration from developed to less developed areas, the reverse is happening today. The composition increasingly shifts towards developed regions as the main regions of destination.

Figure 1.4 shows the development of immigrant stocks as a percentage of

Figure 1.5: Immigrant stock (% of total population), by European regions

Source: United Nations (2015)
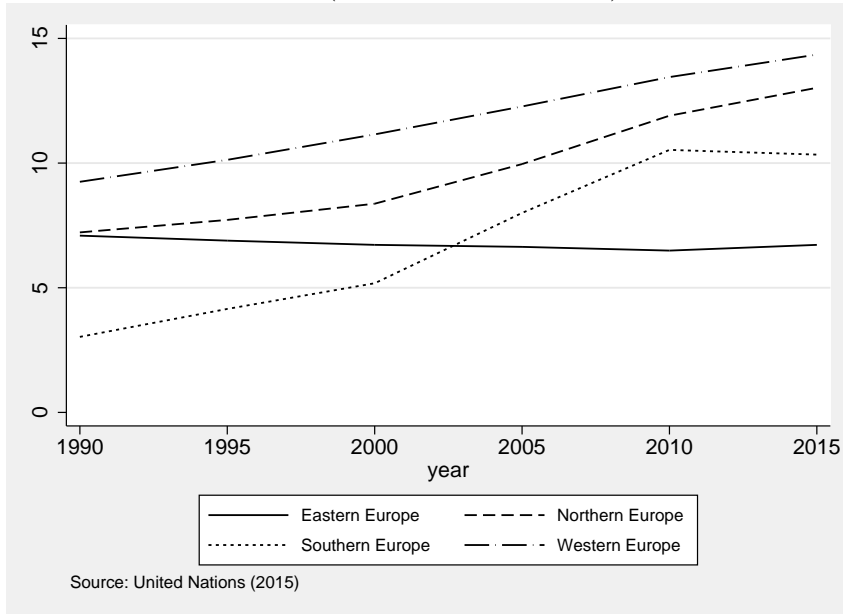
the total population by continents. The share of immigrants living in Oceania, Northern America, and Europe increased from 1990 to 2015. Oceania shows, in general, a high proportion of immigrants with 17.5 percent in 1990 and 20.6 in 2015. Northern America and Europe also show a comparatively high share of immigrants. For Northern America, the share of immigrants ranges from 9.8 percent to 15.2 percent and for Europe from 6.8 percent to 10.3 percent. While Latin America, and in particular Argentina, was one of the most important destination regions from 1800 to 1900 (see section 1.2), the percentage of immigrants in this region, as well as in Asia and Africa, has been rather stable at very low rates in the last 25 years.

Figure 1.5 illustrates the different trends within the European continent for the past 25 years. While the percentage of immigrants living in Eastern Europe is stable at around 7 percent, the share of immigrants in the other regions of Europe increased. Western and Northern Europe have followed a similar trend of increasing shares of immigrants at around the same pace. The proportion of immigrants living in Western Europe increased from 9.2 percent in 1990 to 14.4 percent in 2015. At the same time, the share of immigrants in Northern Europe rose from 7.2 percent to 13 percent. While Northern and Western Europe already experienced large immigration inflows since the 1960s, Southern Europe turned only in the 1990s from a region of emigration into a region of immigration (Peixoto et al., 2012).

While in 1990 the share of immigrants living in Southern Europe was with 3 percent much lower than that of the other regions, it increased steadily over time. In 2005 the share of immigrants living in Southern Europe was higher than the share of immigrants living in Eastern Europe. The change in migration patterns to Southern Europe is due to several different reasons. Many Southern European countries experienced an improvement in living standards and educational levels in the decades before the economic and financial crisis, which increased the employment prospects in these countries (Peixoto et al., 2012). The linguistic and cultural closeness of Southern Europe to several South American countries, and the colonial past of particularly Spain and Portugal, led to increased immigration from South America.[5] Additionally, Southern Europe experienced steep immigration from the new member states of the EU accession in 2004 with Romanians becoming the biggest immigrant group in Spain. As Southern Europe was severely hit by the 2007-2008 global financial crisis, the share of immigrants stagnated since then at around 10 percent.

1.4 Embedment of this dissertation

The overview of the history of and trends in immigration in the previous two sections illustrates the complexity of immigration. This dissertation delves into the economics of immigration to provide a better understanding of the drivers of immigration and the integration of immigrants. In this section, the different chapters are placed into the broader topics of the economics of immigration addressed, namely micro- and macro-level determinants of immigration as well as immigrant's labor market outcomes.

1.4.1 Determinants of immigration

People might want to immigrate because of the situation in the country of origin or because of circumstances in the country of destination. These factors can be divided into push factors, which "push" individuals out of the country of origin, and pull factors, which "pull" individuals into the country of destination.[6]

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[5]The increasingly restrictive immigration policies in the United States following the attack of 9/11 might have boosted that trend additionally (Peixoto et al., 2012).

[6]Bodvarsson and Van den Berg (2013) suggest that one should not only look at why people immigrate but also why they stay. Therefore, they propose to include stay and stay-away factors. However, most of the times the determinants to stay concern the same variable. For instance, political instability in a country can be a push factor, whereas

Macroeconomic determinants of immigration that have been studied account for a large set of push and pull factors as well as bilateral distances. Bilateral distances can be geographical, cultural or economical. Examples of push and pull factors are economic development, employment opportunities, immigrant networks, the political situation, migration policies or welfare generosity of the country of origin as well as of the country of destination.

These determinants have been analyzed in the literature empirically using data on migration flows as well as stocks. Several studies focus on flows into one country (see e.g. Karemera et al., 2000; Brücker et al., 2003; Hatton, 2005; Clark et al., 2007).

Cross-country studies on the determinants of immigration are from Hatton and Williamson (2005), Pedersen et al. (2008) and Mayda (2010). While Hatton and Williamson (2005) use a data set covering in total 80 countries of destination, Pedersen et al. (2008) and Mayda (2010) study immigration to OECD destination countries. All studies find a strong effect on immigration rates if a migrant network of the country of origin is already present. Other determinants they all included and identified as determinants are the geographical distance, either measured as a common border or distance between the capitals and the demographic structure of the population in the country of destination. An additional finding of Mayda (2010) is that, while the theory of push and pull factors suggests that the effect of both should be the same, the pull factors play a bigger role in explaining international determinants of immigration. While pull factors significantly affect the size of migration flows, the findings on push factors are less robust and, if significant, the effect is smaller.

Next to the determinants of why people immigrate, a strand of literature deals with who immigrates by analyzing the determinants of the skill composition of immigrants. The theory on migrant selectivity offers two opposing views. Chiswick (1978; 1999) argues that immigrants are relatively higher educated than the population in the country of origin, thus generally positively selected. He models the returns to immigration for low- and high-skilled and argues that individuals with higher returns to immigration are more likely to immigrate. If the mean earnings in the country of destination are higher, if the labor market rewards for high-skilled are higher in the country of destination, and if the existence of out-of-pocket costs of immigration, then high-skilled are more likely to immigrate than

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political stability might be a stay factor. While it might help to include stay and stay-away factors to visualize the immobility of individuals in general, it does not add different variables to the discussion.

low-skilled. Borjas (1987; 1989; 1999), on the other hand, argues that immigrants are not necessarily positively selected. In his model, he assumes that self-selection of immigrants is driven by differences in the returns to skills between countries and whether these skills can be transferred across borders. Applying the same framework, he argues that welfare generosity leads to a negative self-selection of immigrants. That is, as low-skilled are most likely net receiver and high-skilled most likely net payer in a redistributive welfare state (Borjas, 1999).

In general, immigrants tend to be positively selected regarding education (Grogger and Hanson, 2011). That is, immigrant populations in most countries are higher educated than the remaining population in their country of origin. However, negative selection could still occur in particular countries of destination.

Empirical studies that analyzed the determinants of migrant skill composition, i.e. high- over low-educated migrants, are Docquier et al. (2007) and Beine et al. (2011). Looking at immigrants in OECD countries, Docquier et al. (2007) find that immigrants are positively selected if they are geographically close or have colonial links with the country of destination. Furthermore, immigrants tend to be negatively selected if the share of postsecondary education in the country of origin is higher, and positively selected if GDP increases. Beine et al. (2011) find that immigrants are negatively selected if the immigrant stock in the country of destination, proxying the existing migrant network, is big. Like Docquier et al. (2007), they find a positive effect of geographical distance on the educational selectivity of immigrants.

Some empirical studies have used the educational selectivity of out-migration instead, where the skill ratio of immigrants is analyzed relative to the skill ratio in the population of the country of origin. This educational selectivity of out-migration is used to make sure that the observed educational selectivity of immigrants is due to selectivity and not just a reflection of the skill composition of the country of origin population. Three studies that have analyzed the determinants of educational selectivity of out-migration are Belot and Hatton (2012), Brücker and Defoort (2009) and Grogger and Hanson (2011). They find an effect of differences in the returns to skill, i.e. differences in the wage premium, on the educational selectivity.

Chapter 2 adds to the literature on determinants of immigration as well as immigrant self-selectivity by analyzing whether welfare generosity affects immigration of high- or low-skilled differently. I examine the effect of welfare generosity on the educational selectivity of out-migration from a theoretical as well as empirical perspective. Existing economic research an-

alyzing welfare generosity as a determinant of immigration mostly evolves around the welfare magnet hypothesis as proposed by Borjas (1999). According to this hypothesis, low-skilled (immigrants) self-select into countries with high welfare generosity and high-skilled (immigrants) self-select into countries with low welfare generosity. Empirical studies that look at the role of welfare generosity as determinants of immigration, usually find mixed effects and weak results (Pedersen et al., 2008; Warin and Svaton, 2008; De Giorgi and Pellizzari, 2009; Giulietti et al., 2013; Skupnik, 2014). Due to data limitations, most of these studies do not differentiate between educational levels of immigrants even though this is necessary to fully test the welfare magnet hypothesis. Analyzing the effect of welfare generosity on the selectivity instead of absolute immigration, I investigate whether the weak findings of previous studies might be explained by the dependent variable they used or the low relative importance of welfare generosity compared to other determinants such as income differences.

Economic studies of micro-level determinants of immigration also focus on the labor market. Next to differences between countries, individual-level variables may also affect the immigration decision or mobility degree of a person. Those variables may be travel-related costs, efforts to adapt to a new country (e.g. learn a new language, get acquainted with a new culture, create a new social network) or psychological costs related to leaving friends and family (Schoorl et al., 2000).

Hadler (2006) studies individual mobility intentions in 15 European countries in 2001, including determinants on the macro as well as the micro level. Concerning the individual variables, he finds that mobility intentions are higher for young people. Furthermore, people often intend to immigrate for a better social life. Having children reduces the intentions to immigrate. He finds that the explanatory power of macro-level variables is rather low when looking at individual migration intentions. Hadler (2006) thus argues that research should place more emphasis on individual characteristics to estimate the migration potential more accurately. Using the same data set, but studying immigration intentions of young people from the European Union (EU) member states who joined in 2004, Kahanec and Fabo (2013) also find that immigration intentions are higher for non-married and for males with children and that immigration intentions decrease with age.

Chapter 3 of this dissertation contributes to the literature on microeconomic determinants of mobility intentions exploring the role of family ties. Immigration is more complex for attached individuals, i.e. individuals with a partner or children, as their mobility decision depends on other people but themselves. Furthermore, the analysis is extended to cross-border commuting next to cross-border migrating, as a choice of mobility.

Cross-border commuting, i.e. living in one country and working in another, is a type of mobility that has not received a lot of attention in general (Huber and Nowotny, 2013), and might be particularly important as a possible type of mobility for families and in border regions within the EU. The option for one or both parents to work abroad and live in the country of origin adds a possibility to maximize the family's income and, in the case of children, is an option to reduce the high costs of mobility. The border regions of Europe, due to the right to move and reside freely in Europe, are suitable to analyze the mobility decision between staying, commuting and migrating. The number of cross-border commuters in the EU increased from 490,000 in 1999/2000 to 660,000 in 2006/2007 (Nerb et al., 2009). Even though the absolute number is rather small compared to the total workforce in the EU, the vast increase in cross-border commuting indicates that it might become a very important issue in the future. However, empirical studies on this topic are scarce and more data on cross-border commuting needs to be collected to analyze mobility decisions, i.e. staying, migrating and commuting, throughout Europe. In this chapter, I make use of a dataset on the border regions of Austria and Slovakia, i.e. Vienna, Bratislava, and Trnava, to analyze the effect of family ties on mobility intentions.

1.4.2 Immigrant outcomes

How immigrants and their descendants perform in the country of destination is of great importance, both for researchers as well as policymakers, as fast integration often improves the well-being of immigrants, leads to faster contribution to the destination country's economy and shapes attitudes of natives towards immigration (De la Rica et al., 2013). One of the most important indicators of immigrant's performance is their integration into the labor market (Muus, 2001). Studies analyzing the economic outcomes of immigrants focus on measuring the gap between immigrants and natives in different variables of interest (De la Rica et al., 2013). The labor market outcomes for which immigrant-native gaps have been studied most often are wages and unemployment rates.

Most empirical studies on immigrants' labor market outcomes find a gap between immigrants and natives in unemployment as well as wages (see e.g. Nekby, 2002; Amuedo-Dorantes and De la Rica, 2007; Algan et al., 2010; Dustmann and Frattini, 2011; Basilio et al., 2014; Uhlendorff and Zimmermann, 2014).

One study that provides cross-country evidence on immigrants' labor market integration is from Dustmann and Frattini (2011). They analyze em-

ployment and wage gaps for immigrants and natives in 15 Western European countries using the European Labor Force Survey from 2007 to 2009. They find that immigrants in all countries are disadvantaged relative to natives in employment probabilities as well as regarding the wage distribution.

While immigrant-native gaps in labor market outcomes undoubtedly exist, some evidence suggests that it changes with the time immigrants spend in the country of destination. Amuedo-Dorantes and De la Rica (2007) show that the immigration-native employment gap in Spain decreases with the duration of the immigrant in the country of destination. Concerning the immigrant-native wage gap, Edin et al. (2000) for Sweden and Izquierdo et al. (2009) for Spain find that the wage gap decreases the longer the immigrants are in a particular country of destination. However, the evidence is mixed, with Venturini and Villosio (2006) finding the opposite effect for Italy.

Chapter 4 contributes to the literature on immigrants' labor market outcomes by focusing on another aspect, namely educational mismatches. Educational mismatches refer to differences between the education attained and required for a job. Mismatches can be seen as a huge "brain waste" as the returns to education tend to be lower than for those workers that are correctly matched (Landesmann et al., 2015). Previous evidence shows that mismatches have a negative effect on job satisfaction (Allen and Van der Velden, 2001; García-Espejo and Ibáñez, 2005; Allen and De Weert, 2007) and earnings (Hartog, 2000; Leuven and Oosterbeek, 2011), where the effect on earnings is even stronger for immigrants than natives (Joona et al., 2014).

Chapter 4 attempts to rule out or minimize the possibility that observed immigrant-native gaps in educational mismatches are caused by differences in the quality of the education or language difficulties (McGuinness and Byrne, 2015). Therefore, second generation immigrants and natives in one country, i.e. the Netherlands, who graduated at the same educational level, i.e. applied science graduates, are compared. By focusing on second generation immigrants, furthermore, immigrants and natives are compared who followed the same educational systems before the applied science studies.

Chapter 2

Welfare generosity and educational selectivity of immigrants

2.1 Introduction

Do people immigrate because of welfare benefits? And does welfare generosity attract one type of immigrants more than another? The topic of welfare immigration has always been a heated, highly political debate, most recently illustrated by the former British Prime Minister, David Cameron, who conditioned the stay of the United Kingdom in the EU on being allowed to impose restrictions on immigrants' access to the British welfare system.

Existing economic research dealing with welfare generosity mostly evolves around the welfare magnet hypothesis, as proposed by Borjas (1999). According to this hypothesis, low-skilled immigrants self-select into countries with high welfare generosity and high-skilled immigrants self-select into countries with low welfare generosity.

Following this hypothesis, the effect of welfare generosity on immigration is expected to differ by educational level of immigrants. However, so far, and mainly due to data limitations, most cross-country studies on immigration analyzed the welfare magnet effect ignoring the differences for immigrants by educational level.[1] Those studies on immigration that do not differentiate between educational levels usually find no or only weak effects of

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[1] In the following, I focus on research that studies cross-country immigration. For an overview of country-specific studies see Barrett (2012) and Giulietti and Wahba (2013).

Figure 2.1: Educational selectivity of out-migration

welfare generosity on immigration (Pedersen et al., 2008; Warin and Svaton, 2008; De Giorgi and Pellizzari, 2009; Giulietti et al., 2013; Skupnik, 2014).[2] As the skill level of immigrants is one of the crucial elements of the welfare magnet hypothesis, those studies do not fully test the welfare magnet hypothesis. De Giorgi and Pellizzari (2009) attempt to control for the educational level of immigrants as a robustness check. However, due to the point in time when the educational level is recorded, the results need to be treated with caution. Apart from De Giorgi and Pellizzari (2009), Beine et al. (2011) is to my knowledge the only cross-country study that analyzed the welfare magnet hypothesis differentiating between immigrants by educational level. Examining the effect of diasporas on the composition of immigrant stocks, they also control for welfare generosity with no confirmation of the welfare magnet hypothesis.

The welfare magnet hypothesis does not only imply that the effect of welfare generosity differs by educational level of an immigrant but also that the effect can only be analyzed relative to the country of origin. Figure 2.1 illustrates the differences. Most previous studies have used the stock or flow of high-skilled immigrants from one country of origin to a country of destination relative to the origin or destination population to solely account for the difference in size of destination or origin countries. However, the welfare magnet hypothesis claims that high welfare generosity has a positive effect on the immigration of low-skilled and a negative effect on the immigration of high-skilled. To see whether those groups are indeed affected differently, one has to look at the educational selectivity of immigrants. To make sure that the educational selectivity of immigrants is due to a selection effect,

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[2]Next to testing the welfare magnet effect as a determinant of immigration, the welfare dependency of immigrants has been analyzed. For research on the welfare dependency of immigrants see e.g. Brücker et al. (2002), McKinnish (2005; 2007), Boeri (2010), Barrett et al. (2013), Riphahn et al. (2013).

and not just a reflection of the skill composition of the country of origin population, the educational selectivity of immigrants needs to be analyzed relative to the skill composition in the country of origin.

Despite the political debate, it has to be noted that welfare generosity is only one of many possible determinants of international migration. The weak or insignificant link found in the previous studies might be due to the empirical tests performed or the low relative importance of welfare generosity compared to other determinants such as income differences.

Therefore, in this chapter, I analyze whether welfare generosity affects the educational selectivity of out-migration across countries of origin. The effect of welfare generosity on the selection of immigrants is addressed from a theoretical as well as an empirical perspective. In the theoretical part, I develop a selection equation by skill level that captures the effect of welfare generosity on the selection ratio of out-migration. For this purpose, the selection equation by Grogger and Hanson (2011) is extended, adding welfare generosity to the equation. The results of the model predict that the difference in the welfare generosity of the destination country and the origin country negatively affects the educational selectivity of out-migration. In the empirical part, a merged data set is used which contains, amongst others, the educational selectivity of out-migration and welfare generosity scores. The findings provide some evidence for a weak negative effect on the educational selectivity of out-migration for the skilled selection ratio, i.e. high- and middle- over low-skilled, while no effect can be found when looking at the skilled selection ratio solely. Decomposing welfare generosity into three different components, I find that differences in the pension generosity of the country of destination and the country of origin have a significant negative effect on the educational selectivity of out-migration. The two other components, unemployment and sick pay generosity, do not have an effect.

To my knowledge, this study is the first to theoretically formulate the effect of welfare generosity as a determinant of educational selectivity of out-migration. Three other studies have analyzed the determinants of educational selectivity of out-migration across countries of origin, namely Belot and Hatton (2012), Brücker and Defoort (2009) and Grogger and Hanson (2011). All three studies focus on the effect of differences in the returns to skill (i.e. differences in the wage premium) on the educational selectivity. Grogger and Hanson (2011) analyze the educational selectivity of immigrants to OECD destination countries in 2000/2001. They find a positive effect of increasing returns to skill on the educational selectivity of immigrants. Brücker and Defoort (2009) analyze the educational selectivity of immigrants using data on immigration stock from many origin countries to

six main receiving countries in the OECD between 1975 and 2000. Proxying the returns to skill by Gini coefficients, they find a positive educational selectivity of immigrants. Belot and Hatton (2012) take the welfare magnet effect into account in a robustness check. Proxying welfare generosity with the share of social spending in GDP, they find a negative effect of welfare generosity on the educational selectivity of immigrants, which is getting more robust if other policies are added.

This chapter also adds to the empirical literature on the welfare magnet hypothesis. Firstly, in contrary to most other research that tested the welfare magnet hypothesis, this chapter differentiates the stock of immigrants by educational level. Secondly, welfare generosity scores, instead of solely monetary proxies, are used to measure the welfare generosity of a country.

The remainder of the chapter is organized as follows. In section 2.2 I introduce welfare generosity to the selection equation as proposed by Grogger and Hanson (2011). In section 2.3 the empirical specification based on the results of section 2.2 is introduced. This is followed by information on the different data sources on which the data set of this chapter is based as well as descriptive statistics in section 2.4. In section 2.5 the results are presented. Section 2.6 extends the analysis on the effect of welfare generosity on the educational selectivity of out-migration by exploring the effect of different welfare generosity components, i.e. pension generosity, unemployment insurance generosity and sick pay generosity. The chapter closes with a discussion and some concluding remarks in section 2.7.

2.2   Theoretical framework

To analze the effect of welfare generosity on the educational selectivity of out-migration, this section presents an extended version of the selection equation as suggested by Grogger and Hanson (2011). Like most other studies on the effects of skill differentials on immigration, including Borjas (1999), the Roy (1951) model of income maximization is used to arrive at the self-selection framework in this chapter. Educational selectivity refers to the selectivity of immigrants by education (i.e. skilled immigrants relative to unskilled immigrants). If this ratio is above one, immigrants are positively selected, whereas a ratio below one would refer to negative selection. To make sure that this positive (negative) ratio is due to selectivity, and not just a reflection of the skill composition within the population of the country of origin, I analyze this educational selectivity relative to the population in the country of origin. Thus, skilled immigrants relative to

unskilled immigrants are the numerator, and skilled origin population to unskilled origin population are the denominator.

According to Grogger and Hanson (2011), the utility U_{iod}^s of individual i with skill level s when immigrating from country of origin o to country of destination d is given by

$$U_{iod}^s = \alpha(W_{iod}^s - f_{od} - g_{od}^s) + \varepsilon_{iod}^s \qquad (2.1)$$

where $\alpha > 0$ captures the marginal utility of income. One of the destinations is the country of origin itself for which immigration costs are zero. W_{iod}^s is the wage for individual i with skill level s from country o in country d. The costs of immigrating are split up into two components, f_{od} and g_{od}^s. f_{od} captures the fixed, skill-independent costs (e.g. climate) of moving from o to d, and g_{od}^s captures the skill-dependent costs (e.g. common language) of moving from o to d. ε_{iod}^s is an unobserved idiosyncratic error.

In this chapter, the utility U_{iod}^s furthermore depends on the welfare generosity that individual i from country o receives in country d, WG_{iod}. Welfare generosity is introduced into the model by formulating the wage as expected income, so that expected income EI_{iod}^s can be written as

$$EI_{iod}^s = b^s W_{iod}^s + (1 - b^s) WG_{iod} \qquad (2.2)$$

where $b^s \in [0, 1]$ reflects the skill-dependent probability of receiving a wage, and $(1 - b^s)$ the skill-dependent probability of receiving welfare generosity. Note that welfare generosity in itself is assumed to not be skill-dependent but the probability whether you receive it is. Thus, the utility U_{iod}^s can be written as

$$U_{iod}^s = \alpha[b^s W_{iod}^s + (1 - b^s) WG_{iod} - f_{od} - g_{od}^s] + \varepsilon_{iod}^s \qquad (2.3)$$

The utility of immigrating from destination d to origin o is thus displayed in a linear function of the expected income and fixed skill-independent and skill-specific immigration costs. Following Grogger and Hanson (2011) in applying the results of McFadden (1974), assuming the error term follows an i.i.d. extreme value distribution, the log odds of immigrating (from country o to country of destination d) versus staying in the country of origin o can be written as

$$ln\frac{P_{od}^s}{P_o^s} = \alpha[b^s W_d^s + (1-b^s)WG_d - b^s W_o^s - (1-b^s)WG_o] - \alpha f_{od} - \alpha g_{od}^s \quad (2.4)$$

where P_{od}^s captures the population with skill level s from the country of origin o that immigrates to the country of destination d, and P_o^s the population with skill level s living in country o. Let us further assume that the skill level can take two different values ($s = \{1, 2\}$), where 1 refers to low-skilled, 2 to skilled. In order to analyze the educational selectivity of out-migration, I take the difference of the log odds of immigrating in equation (2.4) for high- (s=2) and low-skilled (s=1).

$$
\begin{aligned}
ln\frac{P_{od}^2}{P_o^2} - ln\frac{P_{od}^1}{P_o^1} \quad = \quad & \alpha[b^2 W_d^2 + (1 - b^2)WG_d - b^2 W_o^2 \qquad\qquad (2.5)\\
& -(1 - b^2)WG_o] - \alpha g_{od}^2 - \alpha[b^1 W_d^1 \\
& +(1 - b^1)WG_d - b^1 W_o^1 - (1 - b^1)WG_o]\\
& +\alpha g_{od}^1
\end{aligned}
$$

Rearranging the difference of the log odds of immigrating for skilled and low-skilled to the educational selectivity of out-migration and simplifying the right-hand side, leads to the following

$$
\begin{aligned}
ln\frac{P_{od}^2}{P_{od}^1} - ln\frac{P_o^2}{P_o^1} \quad = \quad & \alpha[(b^2 W_d^2 - b^1 W_d^1) - (b^2 W_o^2 - b^1 W_o^1)] \qquad (2.6)\\
& -\alpha(b^2 - b^1)(WG_d - WG_o)\\
& -\alpha(g_{od}^2 - g_{od}^1)
\end{aligned}
$$

The effect of differences in welfare generosity in the country of destination and the country of origin depends on the probabilities b^1 and b^2. I assume that b^s is increasing with skill level, so that $b^1 < b^2$. Assuming this, the expression $(b^2 - b^1)$ will always be positive. Thus, the differences in the welfare generosity of the country of destination and the country of origin are expected to affect the educational selectivity of out-migration negatively. $(b^2 W_d^2 - b^1 W_d^1) - (b^2 W_o^2 - b^1 W_o^1)$ can be seen as the expected wage premium. While previous studies on the educational selectivity of out-migration (e.g. Grogger and Hanson, 2011) claim that this ratio is influenced by the actual wage premium, the model in this study predicts that it is, in fact, the expected wage premium and not the actual one that plays a role. Lastly, the educational selectivity of out-migration depends on differences in the costs of moving for low- and high-skilled, $g_{od}^2 - g_{od}^1$. If the costs of moving are higher for high-skilled, it negatively affects the selection ratio. If the costs of moving are higher for low-skilled, it positively affects the ratio. In the empirical specification in section 2.3 several variables that might reflect skill-specific costs of moving are introduced.

2.3 Empirical specification

Based on the theoretical formalization in section 2.2, the following empirical specification is derived:

$$
ln\frac{P_{od}^2}{P_{od}^1} - ln\frac{P_o^2}{P_o^1} = \alpha[(W_d^2 - W_d^1) - (W_o^2 - W_o^1)] \qquad (2.7)
$$
$$
+\beta(WG_d - WG_o) + \theta language
$$
$$
+\vartheta network + \iota border
$$

where the dependent variable $ln\frac{P_{od}^2}{P_{od}^1} - ln\frac{P_o^2}{P_o^1}$ is the log of the ratio of skilled to low-skilled immigrants from the country of origin o to the country of destination d relative to skilled to low-skilled individuals in the population of the country of origin o. Thus, it reflects the educational selectivity of immigrants. As in section 2.2, $WG_d - WG_o$ is the difference between welfare generosity in the country of destination and the country of origin. Based on the predictions from section 2.2, I expect β to be negative, capturing $(1 - b^2) - (1 - b^1) = b^1 - b^2$. Next to the differences in welfare generosity, the differences in the skill-related wage premium between the country of destination and the country of origin are taken into account, displayed by $(W_d^2 - W_d^1) - (W_o^2 - W_o^1)$. The results of section 2.2 predict that the educational selectivity of out-migration depends on the difference in the expected wage premium. Due to a lack of data on the expected wage premium, here I use the actual wage premium. Rewriting the expected wage premium and assuming that $b^1 < b^2$, shows that $b^2(W_d^2 - W_o^2) - b^1(W_d^1 - W_o^1) > (W_d^2 - W_o^2) - (W_d^1 - W_o^1)$. Thus, it is possible that the empirical model underestimates the effect of the (expected) wage premium on the educational selectivity of out-migration.

Furthermore, to capture the effect of differences in costs of moving for skilled and low-skilled, $(g_{od}^2 - g_{od}^1)$ a set of variables, for which skill-varying costs of immigration are expected, is used. The empirical specification does not include any skill-independent fixed costs as they are canceled out (see equation 2.5). *Language* proxies linguistic distance between two countries. It is a dummy variable which equals 1 if the country of destination and the country of origin share the same official language. I expect common language to have a positive effect on the educational selectivity of out-migration since, as Grogger and Hanson (2011) point out, skilled jobs are often more demanding in language capacity than low-skilled jobs as they usually involve communication and information processes. The variable

network captures the skill-specific effect of immigration networks. Immigration networks are found to play an important role in the immigration decision as they lower immigration costs (Massey et al., 1993). I expect strong networks to benefit low-skilled relatively more as they are more reliant on the assistance of immigrant networks present, due to a lack in acquiring the information (e.g. language and credit constraints) (McKenzie and Rapoport, 2010). The variable *border* serves to control for the geographical distance between two countries. It is a dummy which captures whether or not the country of destination and the country of origin share a common border, being 1 if they do share a common border. Grogger and Hanson (2011) argue that illegal immigration gets less costly with decreasing distance and, therefore, they expect that a common border negatively influences the educational selectivity of out-migration. However, given the country sample considered in the empirical part, this can be expected to play a smaller role. To account for a possible skill-dependent effect of a common border, the variable is included. However, it is unclear which effect this variable has in the setting of this study.

The empirical specification will be tested as a fixed effects model as well as a pooled OLS regression. In the fixed effects model, the variables that are constant for country-pairs over time, i.e. *language*, *network*, and *border*, are not estimated.

2.4   Data

The data set comprises information on 15 OECD countries over the period 1985 to 2005 in 5-year intervals. The countries covered in the data set are Australia, Austria, Canada, Denmark, Finland, Germany, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Sweden, United Kingdom and the United States. All countries are included as countries of destination and origin, but Italy, Japan, and Portugal are included as country of origin only. The country selection in this analysis is limited by missing information for countries of destination and countries of origin for some variables.

The final data set is the result of merging several data sources. For the numerator of the dependent variable - the ratio of skilled to low-skilled immigrants from one country to another - the IAB brain drain data set by Brücker et al. (2013) was used. The data set covers bilateral stocks of immigrants aged 25 and older. Choosing this age group reduces the number of student immigrants who most likely only immigrate for a short time due to educational reasons. Immigrant status is defined by country of birth.[3]

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[3]Only for Germany, the concept of citizenship is used to define immigrant status as

Immigrant stocks are distinguished by three educational levels, namely low-skilled, medium-skilled and high-skilled education. Low-skilled refers to lower secondary and primary education as well as to no schooling. Medium-skilled are those who obtain a high-school leaving certificate or equivalent. And high-skilled education comprises any degree higher than high-school leaving certificate or equivalent. For the construction of the denominator of the dependent variable - the ratio of skilled to low-skilled in the population of the country of origin - data from the educational attainment data set by Barro and Lee (2013) was used.

The main independent variable - the difference in the welfare generosity of the country of destination and the country of origin - is based on the Comparative Welfare Entitlement Data Set 2 by Scruggs et al. (2013). The overall welfare generosity score is the sum of the generosity scores of several sub-indices, namely pension generosity, unemployment insurance generosity and sick pay insurance generosity. Each of these sub-indices is computed based on data on benefit replacement rates, qualifying conditions, elements of social insurance coverage and take-up rates (see Scruggs (2014) for details on the methodology).

Like Belot and Hatton (2012) and Grogger and Hanson (2011), I constructed the differences in the skill-wage premium of the destination and origin country using data from the Occupational Wages around the World (OWW) Database by Freeman and Oostendorp (2012).[4] The data set contains information on occupational wages for 161 occupations in many countries, covering the time span of the data set used in this study.[5] Their data set is used as a basis to calculate the skill-wage premium in the following way. First, the wage variable in the OWW Database is used, which provides information on monthly wages with country-specific calibration and imputation as well as lexicographic weighting.[6] These wages are converted into 2010 US dollars. The occupation codes from the International Labour Organization (ILO) October Inquiry used in this data set are then matched to skill levels according to the ILO "International Standard Classification

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no data on the immigrant population by country of birth exists before 2009.

[4]As Belot and Hatton (2012) point out, the Gini coefficient has been used to proxy the returns to skill in many immigration studies. However, the variable is not a good measure as it includes income from all sources and reflects proportions at each income level. Furthermore, the Gini coefficient is a concept that only got more popular in recent years and information is missing for many years in the data set of this study, which drastically reduces the number of observations.

[5]They OWW data set uses data reported by the ILO and standardizes it to correct for different ways in which countries report their earnings.

[6]Freeman and Oostendorp (2012) recommend to use this variable. See http://www.nber.org/oww/ for more details on the variables in the OWW data set

of Occupations" (ISCO-88 codes).[7]   Afterwards, I aggregate the data to skill levels by calculating the skill-specific median (or mean, respectively) for each skill level and country. Thus, the resulting wage premium is the difference between wages of occupations, which require some tertiary (and secondary) education and wages of low- or unskilled occupations.

Information on the variables common border and common language were extracted from the data set constructed and used by Peri (2010). Austria was not included in their data set, so the corresponding values for common border and common language were imputed. The data to proxy immigrant networks comes, as the numerator of the dependent variable, from the IAB brain drain data set by Brücker et al. (2013). The stock of immigrants from the same country of origin, that reside in the country of destination 5 years before, is used.

Table 2.1 provides summary statistics for the resulting data sample used in the analysis. As there are missing observations in several variables, the number of observations per destination country range from 27 to 55 observations.[8][9]

Table 2.1: Summary statistics

Variable	Obs.	Mean	SD	Min	Max
Skilled selection ratio	487	-0.177	1.101	-3.624	2.355
High-skilled selection ratio	487	0.422	1.242	-3.473	3.497
WG_d-WG_o	487	0.453	11.164	-24.9	24.9
$(W_d^2 - W_d^1) - (W_o^2 - W_o^1)$ (mean)	487	4.550	17.289	-53.673	69.069
$(W_d^2 - W_d^1) - (W_o^2 - W_o^1)$ (median)	487	5.004	16.078	-42.964	60.586
border	487	0.111	0.314	0	1
language	487	0.146	0.353	0	1
network	487	8.895	2.337	3.497	13.807

Most empirical studies find international migrants to be positively selected on education (see e.g. Docquier et al., 2007; Beine et al., 2008; Grogger and Hanson, 2011). Thus, the immigrant population of a country tends to be higher educated than the population in their country of origin. Figure 2.2 illustrates this effect for the year 2000 using the whole IAB brain drain

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[7]http://laborsta.ilo.org/applv8/data/to1ae.html

[8]If the data set were fully balanced, it would comprise 75 observations per destination country.

[9]Table 2.7 in the appendix provides the summary statistics including the number of observations for each destination country. Furthermore, figure 2.4 in the appendix shows the development of welfare generosity over time for each country.

data set.[10] The figure plots the share of skilled over low-skilled amongst the origin countries population with the share of skilled over low-skilled immigrants coming from the country. Accordingly, the figure depicts the denominator of the dependent variable on the horizontal axis and the numerator on the vertical axis. The gray line indicates the points at which the ratio is the same amongst immigrants and the origin population. As follows, if the observation is above the line, it is a case of positive selection, and below the line a case of negative selection. As most countries are located above the line, it illustrates the positive selection nicely. Furthermore, among the immigrant population the skill composition is almost never below one. If the ratio is above one, it means that more than half of the population is skilled. As you can see in the figure, this selection effect is even stronger when looking at the selection ratio for only high-skilled.

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[10]The positive selection of immigrants is also observable when only considering the sample of our empirical analysis (see Table 2.5 in the Appendix)

Figure 2.2: Positive selection of immigrants
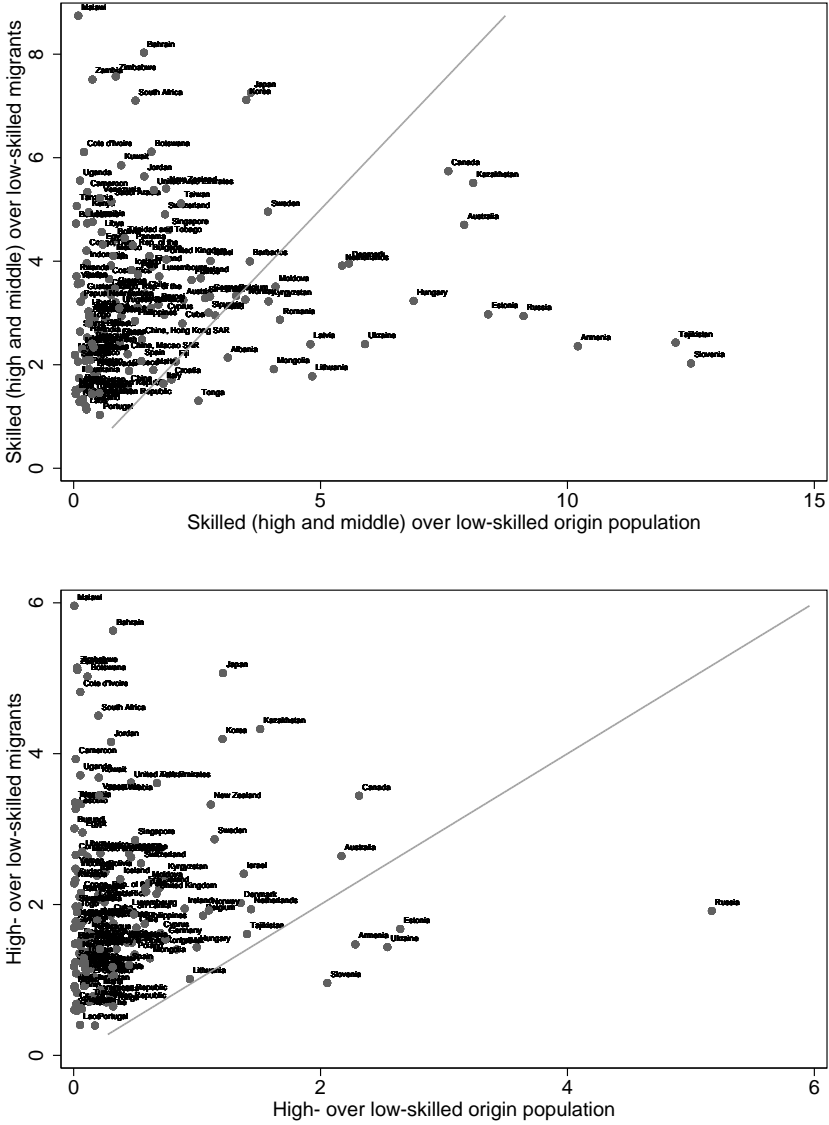
2.5   Results

Tables 2.2 and 2.3 show the results using the empirical specification as derived in equation 2.7. In table 2.2, the skilled selection ratio (i.e. high- and middle-skilled over low-skilled) is the dependent variable, while the high-skilled selection ratio (i.e. high-skilled over low-skilled) is the dependent variable in table 2.3. The first three columns in both tables show the results for the fixed effects model, while the last three columns show the results for the pooled OLS estimations. The results for the fixed effects as well as pooled OLS are reported for three different specifications. Column 1 and 4 show the main specification. For column 2 and 5, a slightly different calculation of the wage premium is used as a robustness check. Instead of using the mean for each skill-specific wage, the median is used. In column 3 and 6, the results are shown for a sample restricted to Intra-EU-15 immigration. Looking at Intra-EU-15 immigration reduces the importance of restrictive immigration policies due to the free mobility of labor within the EU. Razin et al. (2011) as well as Giulietti and Wahba (2013) emphasize that restrictive immigration policies might offset a potential effect of welfare generosity. All specifications control for year-, destination- and origin-specific effects and the standard errors are clustered at the country-pair level.[11]

Since the dependent variable is a difference in log odds, the magnitude of the regression coefficients is not very informative and difficult to interpret. Therefore, the following presentation of the results focuses on the significance and signs of the regression coefficients.

The expected negative effect of welfare generosity, as formulated in section 2.2, is only weakly supported by the empirical results. When looking at the skilled selection ratio (table 2.2), a weakly significant negative effect of welfare generosity can be found for the results of the pooled OLS regression. Thus, according to the pooled OLS results, if differences between welfare generosity are big, immigrants are less high-skilled relative to the origin

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[11]In order to compare this study to earlier empirical research that could not account for skill differences, I performed fixed effects as well as pooled OLS regressions on the absolute stock of immigrants. The corresponding tables can be found in table 2.8 and 2.9 in the Appendix. The results show a positive effect of total welfare generosity on absolute immigration. Accordingly, the more generous a welfare system in the country of destination relative to the country of origin, the bigger the stock of immigrants. These results are robust to all specifications. The results for the wage differences are also robust and positively significant. If the mean wage in the destination country is bigger than in the country of origin, more people immigrate. The other control variables; common language, common border and immigrant networks; also positively affect the total stock of immigrants. However, if looking at absolute migration, the skill-independent determinants of immigration do not cancel out anymore, more skill-independent control variables, such as climate, would need to be added to get a comprehensive picture.

population. However, when controlling for the country-pair specific effect in the fixed effects model, the coefficients are insignificant. Furthermore, this weak effect is also not robust when looking at table 2.3. The differences in welfare generosity in the country of destination and the country of origin do not affect the educational selectivity of out-migration if only high-skilled relative to low-skilled instead of high- and middle-skilled relative to low-skilled are considered in the analysis.

The variable capturing differences in the wage premium between destination and origin country shows almost no effect in tables 2.2 and 2.3. The coefficient is insignificant in all specifications in table 2.3. The non-observable effect of the differences in the wage premium on the educational selectivity of out-migration can be due to two reasons. First, as discussed in section 2.3, using the actual instead of the expected wage premium likely underestimates the effect. Second, we look at immigration within OECD countries. Thus, this chapter studies immigration between countries with relatively similar wage premia. Belot and Hatton (2012), Brücker and Defoort (2009) and Grogger and Hanson (2011), who do find an effect, use data samples that also include origin countries with bigger differences in wage premia.

The variables accounting for differences in costs of moving for low- and high-skilled show the same sign and significance levels in both tables and across specifications. Furthermore, the effects go in the same direction as expected based on section 2.3. The effect of language is positive and highly significant. Thus, immigrants from countries that share the same language as the country of destination are more high-skilled relative to the origin country population than immigrants between countries that have no common official language. This result indicates that, due to a higher language capacity demand for high-skilled, a shared official language is relatively more important for high-skilled than low-skilled. The coefficients of immigrant networks are negative and highly significant. Ceteris paribus, a large amount of immigrants from the country of origin residing in the country of destination reduces the skills of immigrants relative to the origin country population. This finding suggests that low-skilled are indeed more reliant on the assistance of an existing immigrant network than high-skilled. The variable border does not seem to affect the educational selectivity of out-migration. The coefficients of the variable are insignificant in all specifications but one. Following the reasoning in section 2.3, it was unclear whether the variable would have an effect and in which direction. The results suggest that a common border does not change the costs of immigration differently for low- or high-skilled individuals.

Table 2.2: Results for the skilled selection ratio

	FE			Pooled OLS		
	(1)	(2)	(3)	(4)	(5)	(6)
	whole sample	whole sample	within EU-15	whole sample	whole sample	within EU-15
WG_d-WG_o	-0.030	-0.028	-0.056	-0.052*	-0.051*	-0.077*
	(0.030)	(0.029)	(0.042)	(0.031)	(0.030)	(0.042)
$(W_d^2 - W_d^1) - (W_o^2 - W_o^1)$(mean)	0.001		-0.005	0.002		0.0006
	(0.002)		(0.004)	(0.002)		(0.004)
$(W_d^2 - W_d^1) - (W_o^2 - W_o^1)$(median)		0.004			0.005	
		(0.003)			(0.003)	
language	-	-	-	0.785***	0.786***	0.514***
				(0.120)	(0.120)	(0.174)
network	-0.371***	-0.371***	-0.690***	-0.211***	-0.212***	-0.238***
	(0.114)	(0.112)	(0.202)	(0.034)	(0.034)	(0.045)
border	-	-	-	0.033	0.033	0.259
				(0.110)	(0.110)	(0.157)
Constant	3.132***	3.115***	5.825***	1.757**	1.746**	-0.558
				(0.693)	(0.675)	(1.155)
year dummies	-	-	-	yes	yes	yes
destination dummies	-	-	-	yes	yes	yes
origin dummies	-	-	-	yes	yes	yes
Observations	487	487	170	487	487	170
R-squared	0.819	0.819	0.767	0.819	0.819	0.767

Standard errors clustered by country-pair in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2.3: Results for the high-skilled selection ratio

	FE			Pooled OLS		
	(1)	(2)	(3)	(4)	(5)	(6)
	whole sample	whole sample	within EU-15	whole sample	whole sample	within EU-15
WG_d-WG_o	-0.011	-0.012	-0.048	-0.024	-0.030	-0.045
	(0.028)	(0.026)	(0.036)	(0.029)	(0.027)	(0.040)
$(W_d^2 - W_d^1) - (W_o^2 - W_o^1)$ (mean)	0.002	-	-0.0096*	0.0056*	-	-0.002
	(0.003)		(0.005)	(0.003)		(0.005)
$(W_d^2 - W_d^1) - (W_o^2 - W_o^1)$ (median)	-	0.005	-	-	0.008**	-
		(0.004)			(0.004)	
language	-	-	-	0.775***	0.777***	0.541**
				(0.142)	(0.142)	(0.227)
network	-0.360***	-0.361***	-0.759***	-0.282***	-0.283***	-0.355***
	(0.129)	(0.127)	(0.185)	(0.0403)	(0.0404)	(0.070)
border	-	-	-	0.041	0.042	0.411*
				(0.137)	(0.137)	(0.215)
Constant	3.625***	3.615***	6.985***	1.894***	1.899***	4.024***
	(1.153)	(1.132)	(1.632)	(0.396)	(0.396)	(0.844)
year	-	-	-	yes	yes	yes
destination	-	-	-	yes	yes	yes
origin	-	-	-	yes	yes	yes
Observations	487	487	170	487	487	170
R-squared	0.826	0.826	0.665	0.826	0.826	0.665

Standard errors clustered by country-pair in parentheses
*** p<0.01, ** p<0.05, * p<0.1

2.6 Heterogeneity of welfare generosity

The results of section 2.5 indicate that the effect of welfare generosity on the educational selectivity of out-migration is very weak. When looking at the skilled selection ratio, the effect of welfare generosity is already weak. If the high-skilled selection ratio was used, the effect was insignificant. These findings imply that differences in welfare generosity seem to play no or only a small role as determinants of the educational selectivity of out-migration. In this section, I empirically investigate the different components of welfare generosity, and whether possible differing effects are an explanation for the weak findings. In the most extreme case, if the effects of the various components would go into different directions, they could cancel each other out.

Most empirical studies that analyze the link between welfare generosity and immigration treat welfare generosity as one unit. They either use social expenditure as a measure of overall welfare generosity (see e.g. Pedersen et al. 2008; Beine et al. 2011; Skupnik 2014) or proxy welfare generosity using more specific variables such as net replacement rates (see e.g. Giulietti et al., 2013).

To my knowledge, only two studies empirically analyze the effects of different components of welfare generosity separately, namely Warin and Svaton (2008) and Geis et al. (2013). Warin and Svaton (2008) disaggregate social protection expenditure into three components: old-age, family and labor market related expenditures. They find significant effects only when looking at Intra-EU-15 immigration. In this case higher family-related expenditures decrease immigration, while higher old-age related expenditures increase immigration. However, Warin and Svaton (2008) do not differentiate by educational level of immigrants. Geis et al. (2013) analyze the effect of institutional determinants of immigration. Amongst others, they include variables on unemployment protection, education system, health system and pension system in their analysis. They find that generous pension systems decrease immigration, while good education and health system, as well as generous unemployment benefits, increase immigration. When separating between high- and low-skilled the effects remain the same, but a negative effect of unemployment benefits for immigration of high-skilled.

In the following I want to see whether different components of welfare generosity have different effects on the educational selectivity of out-migration. Therefore, the welfare generosity score from Scruggs et al. (2013), used earlier in this chapter, is disaggregated in its sub-indices: pension generosity,

unemployment insurance generosity and sick pay insurance generosity.[12]

Figure 2.3 shows the development of pension generosity, unemployment insurance generosity and sick pay generosity over time. It illustrates that the different components are of varying importance between countries and in some cases even over time within a country.

The results in this section are presented in the same way as in section 2.5. Table 2.4 uses the skilled selection ratio (i.e. high- and middle-skilled over low-skilled), while table 2.5 refers to the high-skilled selection ratio (i.e. high-skilled over low-skilled) as the dependent variable. Column 1 and 4 in both tables show the main specification. Column 2 and 5 use a slightly different calculation of the wage premium as a robustness check. Instead of using the mean for each skill-specific wage, the median is used. In column 3 and 6 the results are shown for a sample restricted to Intra-EU-15 immigration. The main independent variables of interest are the difference in pension generosity of country of destination and country of origin (PG_d-PG_o), the difference in unemployment generosity (UG_d-UG_o) and the difference in sick pay generosity (SG_d-SG_o).[13]

The regression coefficients of the control variables show the same sign and significance as when total welfare generosity is used. Also, the magnitude of the effects is about the same.

However, the results for the welfare generosity components suggest a difference between the effect of pension generosity on the one hand, and unemployment and sick pay generosity on the other. While pension generosity has a significant negative effect on the skilled selection ratio for the fixed effects as well as the pooled OLS estimations, unemployment generosity and sick pay generosity do not. Thus, pension generosity seems to be the driving factor of the effects. Accordingly, big differences between pension generosities in the country of destination and the country of origin decrease the educational selectivity of out-migration. Thus, immigrants are less high-skilled relative to the origin population.

The coefficients of differences in unemployment generosity and sick pay generosity stay insignificant when looking at just the high-skilled selection ratio (table 2.5). Furthermore, the effect of pension generosity is weaker than for the skilled selection ratio.

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[12]Scruggs et al. (2013) define pension as public pensions. Even though countries differ a lot in the extent they provide pensions via private or public schemes, public pensions can clearly be seen as a transfer while it is debated whether private pensions are transfers or rather market incomes.

[13]As UG_d-UG_o and SG_d-SG_o are rather highly correlated (correlation coefficient of 0.596) I ran the regressions also excluding SG_d-SG_o . This does not change the coefficient of the other variables including the coefficients for UG_d-UG_o.

Figure 2.3: Development of different welfare generosity components over time
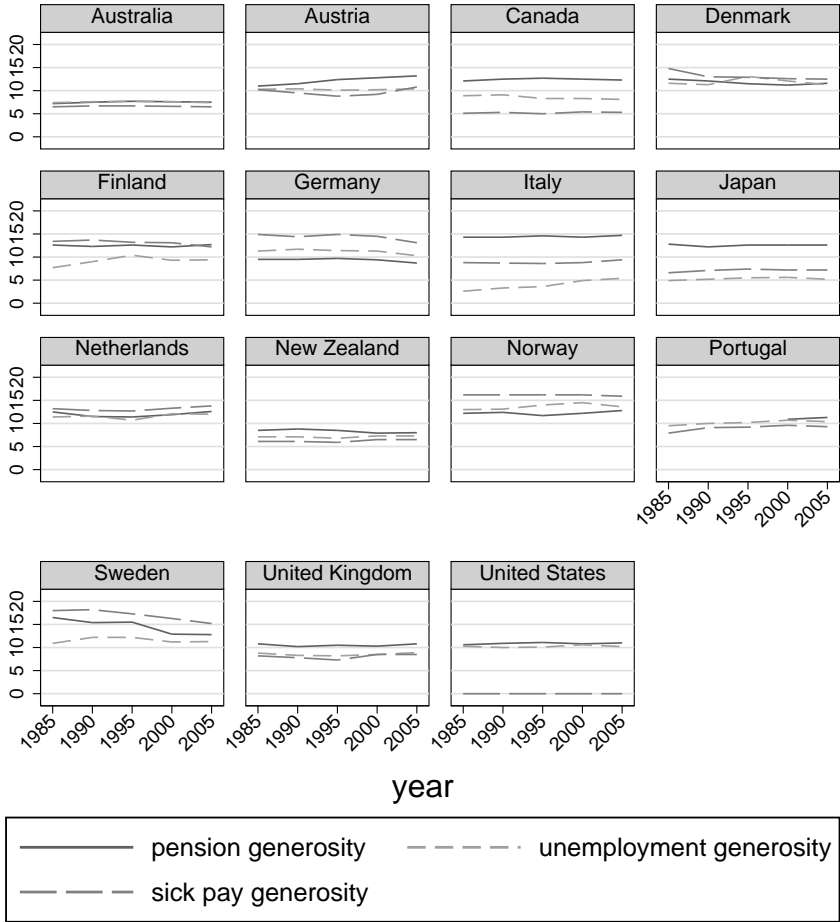
Table 2.4: Results for the skilled selection ratio, differentiating by welfare generosity components

	FE			Pooled OLS		
	(1)	(2)	(3)	(4)	(5)	(6)
	whole sample	whole sample	within EU-15	whole sample	whole sample	within EU-15
PG_d-PG_o	-0.122**	-0.118**	-0.180***	-0.166***	-0.165***	-0.230***
	(0.048)	(0.046)	(0.063)	(0.047)	(0.046)	(0.058)
UG_d-UG_o	-0.032	-0.031	-0.062	-0.054	-0.053	-0.097
	(0.043)	(0.043)	(0.078)	(0.043)	(0.043)	(0.068)
SG_d-SG_o	-0.005	0.001	-0.002	-0.014	-0.012	0.015
	(0.051)	(0.049)	(0.068)	(0.045)	(0.043)	(0.058)
$(W_d^2 - W_d^1) - (W_o^2 - W_o^1)$ (mean)	0.001		-0.006	0.002		-0.002
	(0.003)		(0.004)	(0.002)		(0.004)
$(W_d^2 - W_d^1) - (W_o^2 - W_o^1)$ (median)		0.003			0.004	
		(0.003)			(0.003)	
language	-	-	-	0.781***	0.781***	0.502***
				(0.120)	(0.120)	(0.169)
network	-0.339***	-0.334***	-0.651***	-0.207***	-0.208***	-0.233***
	(0.120)	(0.116)	(0.195)	(0.034)	(0.034)	(0.045)
border	-	-	-	0.031	0.031	0.261*
				(0.110)	(0.111)	(0.155)
Constant	2.803***	2.752***	5.414***	1.920***	0.663	0.784
	(1.075)	(1.040)	(1.715)	(0.616)	(0.890)	(0.596)
year	-	-	-	yes	yes	yes
destination	-	-	-	yes	yes	yes
origin	-	-	-	yes	yes	yes
Observations	487	487	170	487	487	170
R-squared	0.822	0.822	0.780	0.822	0.822	0.780

Standard errors clustered by country-pair in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2.5: Results for the high-skilled selection ratio, differentiating by welfare generosity components

	FE			Pooled OLS		
	(1)	(2)	(3)	(4)	(5)	(6)
	whole sample	whole sample	within EU-15	whole sample	whole sample	within EU-15
PG_d-PG_o	-0.062	-0.066	-0.125*	-0.073	-0.084*	-0.123**
	(0.052)	(0.051)	(0.064)	(0.049)	(0.049)	(0.058)
UG_d-UG_o	-0.013	-0.007	-0.061	-0.007	-0.001	-0.076
	(0.044)	(0.044)	(0.070)	(0.045)	(0.045)	(0.066)
SG_d-SG_o	0.000	-0.004	-0.001	-0.032	-0.044	0.031
	(0.051)	(0.049)	(0.065)	(0.045)	(0.043)	(0.057)
$(W_d^2 - W_d^1) - (W_o^2 - W_o^1)$ (mean)	0.002			0.005		-0.004
	(0.003)			(0.003)		(0.005)
$(W_d^2 - W_d^1) - (W_o^2 - W_o^1)$ (median)		0.006	-0.009**		0.009**	
		(0.004)	(0.005)		(0.004)	
language	-	-	-	0.772***	0.774***	0.532**
				(0.143)	(0.143)	(0.226)
network	-0.343**	-0.345**	-0.727***	-0.281***	-0.282***	-0.352***
	(0.135)	(0.134)	(0.182)	(0.041)	(0.041)	(0.071)
border	-	-	-	0.043	0.044	0.410*
				(0.138)	(0.138)	(0.217)
Constant	3.452***	3.450***	6.648***	1.166	1.484	4.091***
	(1.212)	(1.197)	(1.607)	(0.954)	(0.916)	(0.865)
year	-	-	-	yes	yes	yes
destination	-	-	-	yes	yes	yes
origin	-	-	-	yes	yes	yes
Observations	487	487	170	487	487	170
R-squared	0.827	0.827	0.670	0.827	0.827	0.670

Standard errors clustered by country-pair in parentheses
*** p<0.01, ** p<0.05, * p<0.1

A possible reason for the significant effect of pension generosity and the insignificant effect of unemployment and sickness pay benefits may lie in the income redistribution associated with the different components of welfare generosity. Among the different components of welfare generosity, public old-age pensions show the biggest redistributive effect (Wang et al., 2012). The strong redistributive effect is due to two reasons: elderly have in general no income from work and most public pensions are flat rate (Wang et al., 2012). Table 2.6 shows the redistributive effect of the three components studied in this chapter, based on calculations by Wang et al. (2012). Wang et al. (2012), as well as Mahler and David (2004), use data from the Luxembourg Income Study to calculate the redistributive effect of several programs, among which pensions, unemployment benefits, and sickness pay. They calculate the income redistribution of the different social programs by using the Gini coefficient and looking at the difference between primary income inequality (gross wages and salaries, self-employment income, cash property income, occupational and private pensions, private transfers and other cash income) and disposable income inequality. As shown in table 2.6, pensions in all countries of this study, for which data is available, make up the biggest share of redistribution. Even in countries where redistribution via welfare systems is comparatively small, the income redistribution effect of public pensions accounts for a multiple of the other two components. Public old-age pensions reduce the Gini coefficient by 22 to 83 percent. One can assume that more redistributive welfare generosity components have a stronger effect on the selection ratio of out-migration than less redistributive welfare generosity components, as they are more beneficial for low-skilled and more costly for high-skilled.[14]

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[14]Geis et al. (2013) find that generous old-age pension systems negatively affect immigration to a country. Their explanation is that immigrants first have to pay a correspondingly higher amount of contributions in a more generous welfare system and get the benefits only at a later stage. However, as this argument holds for immigrants independent from their skill level, it does not explain the negative effect of pension generosity on the educational selectivity of out-migration in this study.

Table 2.6: Redistributive effect of different welfare generosity components

| Country | | Redistribution, in percent | |
	Pension	Unemployment benefits	Sickness pay
Australia	22	5	0
Austria	57	5	1
Canada	33	8	-
Denmark	33	8	3
Finland	41	6	1
Germany	52	5	-
Italy	83	2	-
Japan	-	-	-
The Netherlands	48	5	1
New Zealand	-	-	-
Norway	31	4	13
Portugal	-	-	-
Sweden	38	8	5
United Kingdom	27	0	0
United States	34	2	-

source: Wang et al. (2012)

2.7 Conclusion and discussion

This chapter analyzes whether and in what way welfare generosity affects the educational selectivity of out-migration. In the theoretical part, I extend existing selection equations by welfare generosity and show that the difference between welfare generosity in the country of destination and the country of origin may negatively affect the educational selectivity of out-migration. Next to that, the educational selectivity of out-migration depends on the difference in the expected wage premium of the country of destination and origin as well as a set of skill-specific immigration costs. This chapter analyzes whether the relationship between welfare generosity and educational selectivity of out-migration holds empirically looking at immigration between 15 OECD countries over the period 1985 to 2005. The empirical findings only weakly support the hypothesis developed in the selection equation. This suggests that other determinants, such as immigrant networks, may be of relatively higher importance.

Previous research often neglected the role of middle-skilled when analyzing the relation between welfare generosity and skill composition of immigrants. The recent discussion on skill shortages and the fact that middle-skilled amount to about half of the skilled immigrants covered in this data set, illustrates the importance of this group.

To see whether different components of a welfare state have different ef-

fects, total welfare generosity was disaggregated into three sub-indices, i.e. pension generosity, unemployment generosity and sick pay generosity. The findings suggest that unemployment generosity and sick pay generosity have no effect on the skilled selection ratio, while pension generosity has a negative, highly significant effect. It is hard to say what causes the differing effects of pension, unemployment insurance, and sick pay generosity. A possible explanation lies in the strong redistributive effect of public old-age pensions compared to unemployment benefits and sickness pay. However, to identify the causes of differences between the welfare generosity components, further research is needed.

The theoretical formalization of this chapter furthermore suggests that instead of the actual wage premium the expected wage premium, dependent on the probability to receive the wage, should be considered. Whereas this is not the focus of this chapter, future research might attempt to estimate the expected wage premium, for instance using skill-dependent unemployment rates as a proxy for this probability.

This chapter analyzes the effect of welfare generosity on the immigration decision of skilled and unskilled individuals. However, the immigration decision is most likely not only affected by the welfare generosity of a country, but also by the contributions and taxes associated with it. Due to a lack of data on the contributions and taxes by countries and skill groups, this aspect could not be included in the analysis. For future research, it would be interesting to look at the effect of net welfare generosity, i.e. the effect of welfare generosity after contributions and taxes, on the educational selectivity of out-migration.

The results of this chapter suggest that middle-skilled play an important role when analyzing the educational selectivity of out-migration and this effect is driven by the difference in pension generosity of the country of destination and country of origin. However, it should be noted that the set of countries between which immigration is observed in this chapter comprises developed countries alone. The effect might differ when countries are more diverse. Most studies that analyze the relationship between immigration and welfare generosity run the risk of suffering from an endogeneity problem due to reverse causality. Immigration might not only influence welfare generosity, but welfare generosity may affect, directly or indirectly, also the welfare generosity of the countries. As this chapter can also not overcome this problem, the empirical results should be seen as a first step to test the above developed hypothesis.

2.8   Appendix

Table 2.7: Summary statistics by destination country

Destination Country	Variable	Obs.	Mean	SD	Min	Max
Australia	Skilled selection ratio	48	0.374	0.696	-1.367	1.810
	High-skilled selection ratio	48	1.164	0.706	-0.321	2.959
	WG_d-WG_o	48	-10.588	7.377	-24.3	1
	PG_d-PG_o	48	-4.508	1.711	-9.3	-1.3
	UG_d-UG_o	48	-2.152	3.015	-6.9	4.8
	SG_d-SG_o	48	-3.892	4.846	-11.5	6.7
	WP_d-WP_o (mean)	48	-3.061	14.700	-40.137	21.980
	WP_d-WP_o (median)	48	-2.838	13.023	-35.545	17.415
	border	48	0	0	0	0
	language	48	0.25	0.438	0	1
	network	48	10.079	1.809	7.657	13.807
Austria	Skilled selection ratio	48	0.191	0.960	-2.489	2.049
	High-skilled selection ratio	48	0.384	1.005	-2.275	2.258
	WG_d-WG_o	48	0.221	7.982	-14.4	10.8
	PG_d-PG_o	48	0.223	2.24	-5.5	5.2
	UG_d-UG_o	48	0.771	3.075	-4.3	7.7
	SG_d-SG_o	48	-0.788	4.977	-8.7	10.2
	WP_d-WP_o (mean)	48	-2.582	12.418	-29.845	22.841
	WP_d-WP_o (median)	48	-2.277	11.957	-30.069	17.380
	border	48	0.167	0.377	0	1
	language	48	0.083	0.279	0	1
	network	48	7.491	1.699	4.060	11.540
Canada	Skilled selection ratio	32	-0.161	0.769	-1.705	1.582
	High-skilled selection ratio	32	0.814	0.866	-1.371	2.598
	WG_d-WG_o	32	-5.106	6.988	-19.3	5.2
	PG_d-PG_o	32	0.725	2.041	-4.4	4.9
	UG_d-UG_o	32	-0.981	2.822	-6.2	6.3
	SG_d-SG_o	32	-4.853	4.630	-12.9	5.4
	WP_d-WP_o (mean)	32	1.712	17.580	-53.673	25.602
	WP_d-WP_o (median)	32	5.135	16.710	-42.964	27.753
	border	32	0.0938	0.296	0	1
	language	32	0.344	0.483	0	1
	network	32	10.942	1.549	8.646	13.544
Denmark	Skilled selection ratio	34	-0.690	0.892	-2.669	1.343
	High-skilled selection ratio	34	-0.194	1.064	-2.389	1.687
	WG_d-WG_o	34	6.606	7.490	-9.3	18

		N				
	PG_d-PG_o	34	0.609	2.13	-4	5.3
	UG_d-UG_o	34	2.17	2.82	-2.4	9
	SG_d-SG_o	34	3.809	4.874	-5.2	14.8
	WP_d-WP_o (mean)	34	21.249	17.348	-4.220	69.069
	WP_d-WP_o (median)	34	20.618	15.383	-60.499	60.586
	border	34	0.088	0.288	0	1
	language	34	0	0	0	0
	network	34	7.725	1.466	4.727	10.053
	Skilled selection ratio	53	-1.161	1.018	-3.624	1.0734
	High-skilled selection ratio	53	-0.490	1.204	-3.474	1.524
	WG_d-WG_o	53	3.545	7.498	-11.7	15
	PG_d-PG_o	53	0.789	2.012	-3.9	5.4
	UG_d-UG_o	53	-0.574	3.098	-6.3	6.8
Finland	SG_d-SG_o	53	3.33	4.80	-4.6	13.7
	WP_d-WP_o (mean)	53	2.969	15.843	-44.025	36.658
	WP_d-WP_o (median)	53	5.913	14.698	-36.649	34.301
	border	53	0.132	0.342	0	1
	language	53	0.057	0.233	0	1
	network	53	6.016	1.281	3.497	8.631
	Skilled selection ratio	50	-0.116	0.815	-2.029	1.215
	High-skilled selection ratio	50	0.326	0.985	-1.912	2.508
	WG_d-WG_o	50	4.582	7.212	-10.2	14.8
	PG_d-PG_o	50	-2.558	1.947	-7	2.3
	UG_d-UG_o	50	2.06	2.85	-3.2	8.7
Germany	SG_d-SG_o	50	5.076	4.600	-3.8	14.9
	WP_d-WP_o (mean)	50	20.631	14.520	-23.456	52.686
	WP_d-WP_o (median)	50	20.246	14.039	-16.815	47.449
	border	50	0.26	0.443	0	1
	language	50	0.16	0.370	0	1
	network	50	10.433	1.395	8.367	13.269
	Skilled selection ratio	27	-1.490	0.833	-3.372	-0.087
	High-skilled selection ratio	27	-1.046	1.08	-3.435	0.539
	WG_d-WG_o	27	5.411	8.143	-9.7	16.2
	PG_d-PG_o	27	0.467	2.243	-4	5.3
	UG_d-UG_o	27	2.174	3.039	-2.6	8.8
The Netherlands	SG_d-SG_o	27	2.704	4.998	-5.4	13.2
	WP_d-WP_o (mean)	27	-2.278	10.646	-24.564	20.111
	WP_d-WP_o (median)	27	0.580	10.901	-21.338	19.937
	border	27	0.148	0.362	0	1
	language	27	0.074	0.267	0	1

	network	27	8.247	1.347	6.390	11.176
	Skilled selection ratio	27	0.534	0.877	-1.673	2.355
	High-skilled selection ratio	27	1.583	1.019	-0.837	3.497
	WG_d-WG_o	27	-10.404	7.758	-23.7	1.2
	PG_d-PG_o	27	-3.156	2.055	-8	1.3
	UG_d-UG_o	27	-2.548	3.021	-6.9	4.5
New Zealand	SG_d-SG_o	27	-4.715	4.881	-12.1	6.1
	WP_d-WP_o (mean)	27	-0.021	10.658	-21.478	23.197
	WP_d-WP_o (median)	27	-2.997	10.931	-23.951	17.323
	border	27	0	0	0	0
	language	27	0.269	0.447	0	1
	network	27	7.620	2.045	5.403	12.279
	Skilled selection ratio	48	0.343	0.891	-2.064	1.904
	High-skilled selection ratio	48	0.656	1.105	-2.355	2.615
	WG_d-WG_o	48	11.390	7.339	-4.1	21.5
	PG_d-PG_o	48	0.55	2.150	-4.3	5
	UG_d-UG_o	48	4.371	2.880	-1	10.4
Norway	SG_d-SG_o	48	6.488	4.623	-2	16.2
	WP_d-WP_o (mean)	48	-8.146	12.502	-43.076	14.062
	WP_d-WP_o (median)	48	-7.650	11.685	-41.033	10.580
	border	48	0.146	0.357	0	1
	language	48	0	0	0	0
	network	48	7.587	1.428	5.088	9.652
	Skilled selection ratio	37	-0.522	0.890	-2.732	0.791
	High-skilled selection ratio	37	-0.167	1.075	-2.747	1.396
	WG_d-WG_o	37	14.824	7.164	3	24.9
	PG_d-PG_o	37	4.505	1.887	0.9	9.3
	UG_d-UG_o	37	2.351	3.108	-3.1	8.9
Sweden	SG_d-SG_o	37	8.022	4.571	1.1	18.2
	WP_d-WP_o (mean)	37	5.474	17.130	-21.669	44.694
	WP_d-WP_o (median)	37	1.986	12.166	-25.315	22.133
	border	37	0.162	0.374	0	1
	language	37	0.081	0.277	0	1
	network	37	8.599	2.005	4.431	12.211
	Skilled selection ratio	28	-1.114	0.883	-3.431	0.736
	High-skilled selection ratio	28	-0.205	1.002	-3.209	1.315
	WG_d-WG_o	28	-4.104	7.173	-18.8	7
	PG_d-PG_o	28	-1.321	1.934	-5	2.8
	UG_d-UG_o	28	-1.161	2.866	-6	4.6
United Kingdom	SG_d-SG_o	28	-1.671	4.938	-10	8.5
	WP_d-WP_o (mean)	28	4.239	17.985	-35.664	33.405

|					
WP_d-WP_o (median)	28	7.925	15.954	-32.072	37.373
border	28	0	0	0	0
language	28	0.25	0.441	0	1
network	28	10.126	1.177	8.052	12.009
	Skilled selection ratio	55	0.773	0.790	-0.605	2.237
	High-skilled selection ratio	55	1.589	0.711	0.097	2.793
	WG_d-WG_o	55	-11.005	6.938	-24.9	-0.2
	PG_d-PG_o	55	-0.856	2.062	-5.9	3.4
United States	UG_d-UG_o	55	0.796	2.950	-3.9	7.7
	SG_d-SG_o	55	-10.933	3.752	-18.2	-5.1
	WP_d-WP_o (mean)	55	11.865	14.823	-27.396	41.673
	WP_d-WP_o (median)	55	11.430	13.971	-26.468	35.819
	border	55	0.055	0.229	0	1
	language	55	0.255	0.440	0	1
	network	55	11.650	1.386	9.111	13.571

Figure 2.4: Development of welfare generosity over time
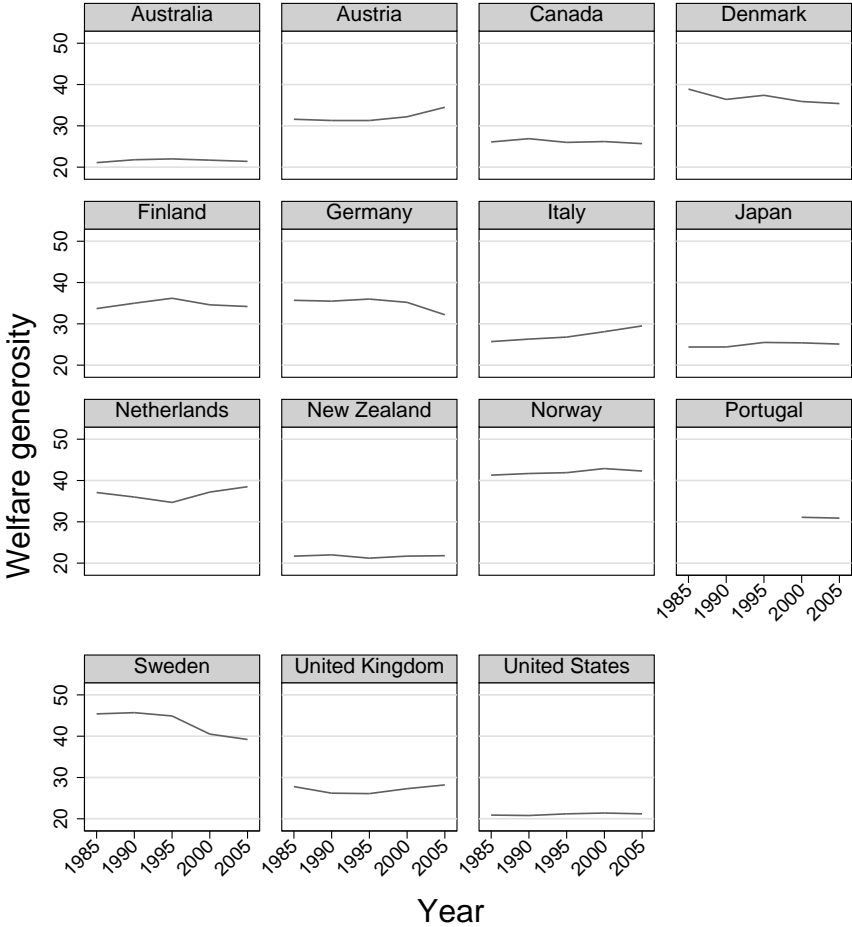
Figure 2.5: Positive selection of immigrants in the sample
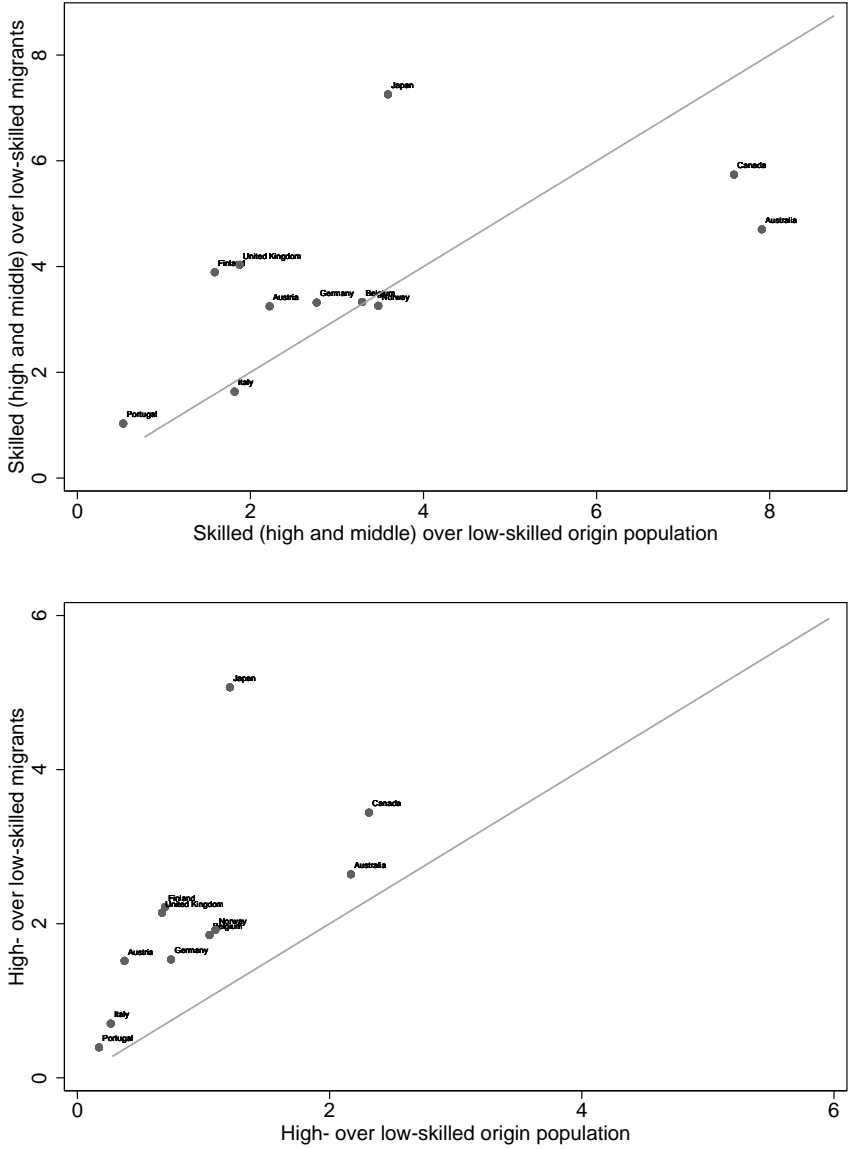
Table 2.8: Absolute immigration, total welfare generosity

	FE			Pooled OLS		
	(1)	(2)	(3)	(4)	(5)	(6)
	whole sample	whole sample	within EU-15	whole sample	whole sample	within EU-15
WG$_d$-WG$_o$	0.021**	0.021**	0.028**	0.022**	0.020***	0.026**
	(0.009)	(0.009)	(0.011)	(0.008)	(0.008)	(0.010)
$W_d^{mean} - W_d^{mean}$	0.004***	-	0.005**	0.005***	-	0.005**
	(0.001)		(0.002)	(0.001)		(0.003)
$W_d^{median} - W_d^{median}$	-	0.005***	-	-	0.005***	-
		(0.001)			(0.001)	
language	-	-	-	0.105***	0.104***	0.0982*
				(0.034)	(0.034)	(0.052)
network	0.615***	0.606***	0.865***	0.942***	0.941***	0.944***
	(0.173)	(0.170)	(0.055)	(0.017)	(0.017)	(0.016)
border	-	-	-	0.058*	0.060**	0.040
				(0.030)	(0.030)	(0.042)
Constant	3.524**	3.601**	1.237**	0.665***	0.666***	0.407**
	(1.543)	(1.514)	(0.472)	(0.146)	(0.146)	(0.165)
year dummies	-	-	-	yes	yes	yes
destination dummies	-	-	-	yes	yes	yes
origin dummies	-	-	-	yes	yes	yes
Observations	487	487	170	487	487	170
R-squared	0.990	0.990	0.993	0.990	0.990	0.993

Standard errors clustered by country-pair in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2.9: Absolute immigration, different welfare generosity components

	FE			Pooled OLS		
	(1)	(2)	(3)	(4)	(5)	(6)
	whole sample	whole sample	within EU-15	whole sample	whole sample	within EU-15
PG_d-PG_o	0.010	0.012	0.084***	-0.032	-0.035	0.50
	(0.033)	(0.031)	(0.026)	(0.055)	(0.052)	(0.039)
UG_d-UG_o	0.072*	0.069*	0.037	0.019	0.017	0.002
	(0.037)	(0.036)	(0.025)	(0.020)	(0.020)	(0.024)
SG_d-SG_o	-0.035	-0.032	-0.004	0.047**	0.048**	0.045**
	(0.036)	(0.033)	(0.024)	(0.018)	(0.019)	(0.021)
$W_d^{mean} - W_d^{mean}$	0.002	-	0.006***	0.004*		0.006**
	(0.002)		(0.002)	(0.002)		(0.002)
$W_d^{median} - W_d^{median}$		0.003*	-		0.005**	
		(0.002)			(0.002)	
language	-	-	-	0.103***	0.102***	0.0987*
				(0.033)	(0.033)	(0.051)
network	0.571***	0.568***	0.842***	0.944***	0.944***	0.944***
	(0.180)	(0.175)	(0.061)	(0.015)	(0.015)	(0.015)
border	-	-	-	0.056*	0.057*	0.039
				(0.030)	(0.030)	(0.042)
Constant	3.888**	3.915**	1.464***	0.092	0.101	0.210
	(1.572)	(1.530)	(0.526)	(0.168)	(0.164)	(0.362)
year	-	-	-	yes	yes	yes
destination	-	-	-	yes	yes	yes
origin	-	-	-	yes	yes	yes
Observations	487	487	170	487	487	170
R-squared	0.990	0.990	0.993	0.990	0.990	0.993

Standard errors clustered by country-pair in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Chapter 3

Should I stay, commute or migrate? The effect of family ties on cross-border mobility intentions

3.1   Introduction

Despite the Citizens Rights Directive 2004/38/EC, which grants citizens of the European Union the right to move and reside freely, Intra-EU mobility remains rather low. While Intra-US migration amounted to 2.3 percent of the total population in 2014, Intra-EU migration amounted to only 0.37 percent of the total population (OECD, 2016). Acoording to OECD (2016), this immobility needs to be reduced in order to foster economic growth. The observed immobility can be due to the big monetary and non-monetary costs of cross-border mobility. The costs of cross-border mobility are particularly high for attached individuals, i.e. those having a partner or children. Mincer (1978) was the first to highlight the importance of family ties in migration decisions. This theory, which focuses on the joint decision as a family and is illustrated later in the chapter, paved the way for variables on family ties to enter empirical studies on migration decisions. Particularly in the light of increasing labor participation rates of women, joint location decisions have become more complex (Smits et al., 2003; Tenn, 2010). To foster labor mobility within Europe, the role of family ties in mobility decisions needs to be better understood.

This chapter, therefore, analyzes the role of family ties as determinants of

mobility intentions. Firstly, the mobility decision of a two-person household is modeled, also referred to as family mobility. Furthermore, it is shown under which conditions the household decides to stay, to migrate or to have one or both household members cross-border commute. Secondly, I analyze individual survey data on mobility intentions and look at the effect of family ties on the likelihood of intentions to stay, cross-border commute or migrate. Previous research has shown that women are less mobile than men. Therefore, in an additional step, I investigate whether family ties are weighted differently depending on a person's gender. The data in this study covers migration intentions in the border regions of Austria and Slovakia. The border regions of both countries (Vienna, Bratislava and Trnava, respectively) are densely populated and geographically close. As a result, these regions allow for cross-border migration as well as cross-border commuting to occur, thereby making them particularly suitable to analyze cross-border mobility.

As in other studies on migration intentions, it is important to note that intentions may not necessarily correspond to actual realizations (Manski, 1990; Bertrand and Mullainathan, 2001). However, Zaiceva and Zimmermann (2008) review studies that indicate a close link between migration intentions and subsequent actual moves. Furthermore, in this chapter I study border regions. Due to the geographical closeness and the opportunity of free migration, I assume that the mobility intentions are not biased due to a lack of information on or restrictive immigration policies of the potential host country. Additionally, in the chapter determinants of mobility are studied, which can be expected to be less biased than actual migration (Zaiceva and Zimmermann, 2008).

The findings suggest that family ties matter to some extent, with a strong effect of having a partner, a smaller effect of children living in the household and weak effects of partner characteristics. The empirical analysis suggests that having a partner reduces mobility intentions, with a higher likelihood of intending to stay and a decreased likelihood to intend to cross-border commute or migrate. Children reduce the likelihood to migrate. To include more detailed partner characteristics, mobility intentions among respondents in two-partner households are analyzed, and it is found that if the partner plans to work abroad, it increases the respondent's mobility intentions. Analyzing gender differences, the results suggest that the presence of children affects mobility intentions of women differently than men, whereas having a partner or partner characteristics do not differently affect men and women.

The two most prominent economic theories on family migration decisions are introduced by Jacob Mincer (Mincer, 1978) and Oded Stark (Stark

and Levhari, 1982; Stark, 1984; Stark and Yitzhaki, 1988; Stark, 2003). Economic theories of migration are often based on the idea, introduced by Sjaastad (1962), that a location change can be seen as a human capital investment. Mincer (1978) was the first to integrate the conflicting interests within family migration decisions into this approach. According to his model, family migration depends on the family's joint real income gain, which is the sum of the individual gains, and families can decide to migrate together or stay. As the migration decision of the family is determined by the family's joint real income, the decision might be inefficient from an individual perspective if individual gains are negatively correlated. If the joint gains are positive, even though one of the household members experiences a loss from migrating, the family migrates. If the joint gains are negative, even though one of the individuals experiences a gain from migrating, the family stays. In the former case, the person who migrates despite experiencing a loss is referred to as tied mover, whereas, in the latter case, the person who stays is referred to as tied stayer.

Stark (2003) sees family migration decisions as a risk diversification where family members are sent to work abroad to create a fallback option given risky labor markets at home. In this model, the migration of some family members is seen as a possibility to send remittances from abroad due to insufficient social and private insurance nets to fall back on (Bodvarsson and Van den Berg, 2013).

Most empirical literature on determinants of family migration uses Mincer's (1978) model as a starting point. When comparing couples to singles, a general empirical finding is that couples are less likely to migrate than singles, particularly in the case of dual-earner couples where it might be difficult to find a suitable job match for both (Junge et al., 2014). The presence of children is found to decrease the likelihood of migration as well (Nivalainen, 2004). Nivalainen (2004), furthermore, concludes that in particular, the presence of school-aged children reduces the likelihood to migrate.

It is a rather consistent finding in the literature that women tend to be less mobile than men. Explanations may lie in different employment characteristics (e.g. higher share of part-time work for women) or differences in family responsibilities (e.g. education of children). Empirical studies furthermore indicate that the decision to migrate is dominated by the husband's characteristics and not the wife's (Duncan and Perrucci, 1976; Axelsson and Westerlund, 1998; Nivalainen, 2004; Compton and Pollak, 2007; Swain and Garasky, 2007; Tenn, 2010).[1]

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[1]To my knowledge only two studies found a significant effect of the wife's characteris-

To my knowledge, this chapter is the first study to include commuting as an additional type of mobility when analyzing the effect of family ties. Cross-border commuting is a type of mobility that has not received a lot of attention in general (Huber and Nowotny, 2013), and might be particularly important as a possible type of mobility for families. The option for one or both parents to work abroad and live in the home country adds a possibility to maximize the family's income and, in the case of children, is an option to reduce the high costs of mobility in the presence of children. Furthermore, this study is able to control for an extensive set of variables capturing family ties. These variables capture whether a respondent has a partner, the partner's characteristics and the presence of children; in general, under-aged, and in different minor age groups.

The remainder of the chapter is organized as follows. In section 3.2 a model of regional mobility of households is developed to analyze their optimal mobility strategy. Section 3.3 describes the data set used in this chapter and presents some descriptive statistics. This is followed by a presentation and discussion of the results in section 3.4. Furthermore, section 3.5 considers gender-specific results. This is followed by a discussion and conclusion in section 3.6.

3.2   Mobility and family ties

3.2.1   Family mobility decisions

Based on the model of individual mobility suggested by Huber and Nowotny (2013), in this section a model of mobility of households is developed. Consider an economy with a large number of households that consists of two working individuals, $i \in \{1, 2\}$, which derive utility from income and regional amenities. Regional mobility can occur via two channels, namely migration and commuting. The household can live and work in one of two regions, i.e. in the home region (h) or abroad (a). When migrating as well as commuting the household faces costs. In the following, I focus on

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tics on family migration, i.e. Pailhe and Solaz (2008) and Shields and Shields (1993). A study by Smits et al. (2003) suggests that the importance of the husband's and the wife's characteristics can get more balanced due to the increase in the economic importance of the wife's career. Junge et al. (2014) find that it is more the primary earner's characteristics, which are determining the probability to migrate rather than the earnings of the male partner. Yet, they find family migration decisions, in general, to be more responsive to male than female partner's characteristics. Furthermore, Tenn (2010) finds that family migration decision are still mainly driven by the husband's characteristics.

a household residing in the home region. If the household members work and live in the home region the utility can be written as

$$U^S = w_h^1 + w_h^2 + a_h \tag{3.1}$$

where w_h^i is the wage of individual i in the home region h and a_h are the amenities from living in the home region.

Furthermore, assume that individuals in a household can only move together and that moving (i.e. migrating) bears costs k. Accordingly, the utility of migrating can be written as

$$U^M = w_a^1 + w_a^2 + a_a - k \tag{3.2}$$

Next to staying or migrating, one or both of the individuals in the household can commute at costs c^i. Assuming that commuting is equivalent to continue living in region h and working in region a, the utility can be written as

If person 1 commutes:

$$U^{C1} = w_a^1 + w_h^2 + a_h - c^1 \tag{3.3}$$

If person 2 commutes:

$$U^{C2} = w_h^1 + w_a^2 + a_h - c^2 \tag{3.4}$$

If both commute:

$$U^{CB} = w_a^1 + w_a^2 + a_h - c^1 - c^2 \tag{3.5}$$

Using equations 3.1 to 3.5 I compute the differentials between the different utilities. The differentials between the utility of staying (U^S) and the utility of the different types of mobility $(U^M, U^{C1}, U^{C2}, U^{CB})$ is given by

$$U^M - U^S = w_a^1 - w_h^1 + w_a^2 - w_h^2 + a_a - a_h - k$$
$$U^{C1} - U^S = w_a^1 - w_h^1 - c^1$$
$$U^{C2} - U^S = w_a^2 - w_h^2 - c^2$$
$$U^{CB} - U^S = w_a^1 - w_h^1 + w_a^2 - w_h^2 - c^1 - c^2$$

Thus, the household decides to be mobile if the increase in wage and, in the case of migration, in amenities, abroad are bigger than the costs resulting from mobility.

In the decision of whether to migrate or commute, households face the following utility differentials:

$$U^M - U^{C1} = w_a^2 - w_h^2 + a_a - a_h - k + c^1$$
$$U^M - U^{C2} = w_a^1 - w_h^1 + a_a - a_h - k + c^2$$
$$U^M - U^{CB} = a_a - a_h - k + c^1 + c^2$$

The household decides to migrate instead, if the amenities abroad are higher than at home and the costs of migrating are either lower than the costs of commuting or the difference between the cost components is still lower than the gain through the amenities. In the case of the differentials for migrating and only one household member commuting, i.e. $U^M - U^{C1}$ and $U^M - U^{C2}$, the differential furthermore depends on the wage differential for the household member who continues working at home. If this person experiences a wage decrease from moving, the other household member decides to commute. While in Mincer's (1978) model families might have migrated or stayed even though this would only have been beneficial for the wage of one of the household members, in this case, one of the household members can cross-border commute, which results in a higher utility.

Lastly, the differentials between the different commuting decisions can be written as

$$U^{CB} - U^{C1} = w_a^2 - w_h^2 - c^2$$
$$U^{CB} - U^{C2} = w_a^1 - w_h^1 - c^1$$
$$U^{C1} - U^{C2} = w_a^1 - w_h^1 - w_a^2 - w_h^2 - c^1 + c^2$$

It follows that households decide to both commute instead of only one if, as in the case of migration, the other person experiences an increase in the wage from working abroad that exceeds the costs of this household member. Furthermore, person 1 commutes instead of person 2 if the wage increase of person 1 from working abroad is higher than that of person 2 and the costs are lower, and vice versa.

Consider the case that commuting of both household members is always sub-optimal relative to migration and the utility of person 1 commuting is higher than the utility of person 2 commuting (i.e. assume $U^M - U^{CB} > 0$ and $U^{C1} - U^{C2} > 0$). In this case person 1

1. commutes if $U^M - U^{C1} < 0$ and $U^{C1} - U^S > 0$. Thus, if $w_a^2 - w_h^2 + a_a - a_h - k + c^1 < 0$ and $w_a^1 - w_h^1 - c^1 > 0$

2. migrates if $U^M - U^{C1} > 0$ and $U^M - U^S > 0$. Thus, if $w_a^2 - w_h^2 + a_a - a_h - k + c^1 > 0$ and $w_a^1 - w_h^1 + w_a^2 - w_h^2 + a_a - a_h - k > 0$

3. stays if $U^{C1} - U^S < 0$ and $U^M - U^S < 0$. Thus, if $w_a^1 - w_h^1 - c^1 < 0$ and $w_a^1 - w_h^1 + w_a^2 - w_h^2 + a_a - a_h - k < 0$

Figure 3.1 illustrates this optimal choice strategy for person 1. The figure shows the optimal choice strategy based on the utility gains between choices. The axes display the differences between the utility to migrate, commute and stay for person 1. The optimal choice set for person 1 changes, if the utility of person 1 commuting, U^{C1}, is not necessarily higher than the utility of commuting of person 2, U^{C2}, illustrated in figure 3.2. In this case, and assuming $U^{C1} - U^S = U^{C2} - U^S$ and $U^M - U^{C2} < 0$ the optimal mobility choice of person 1 does not only depend on $U^M - U^S$, $U^M - U^{C1}$ and $U^{C1} - U^S$ but also on $U^{C1} - U^{C2}$.

Figure 3.1: Optimal mobility choice strategy person 1
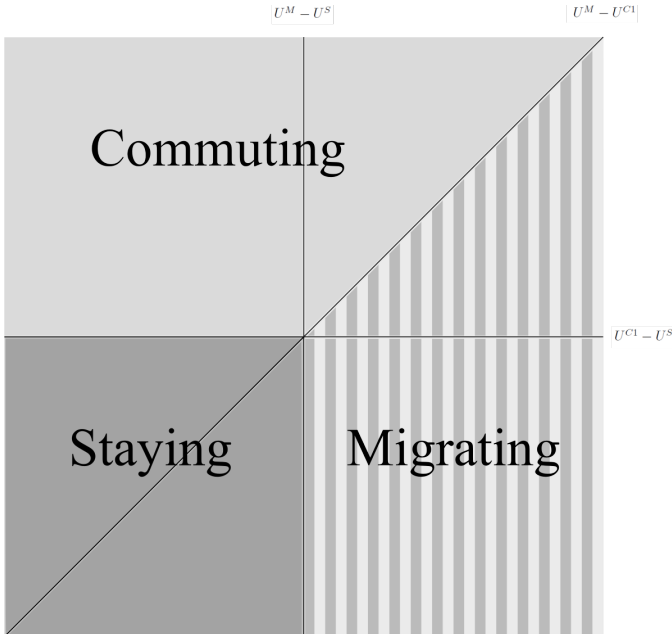
Figure 3.2: Optimal mobility choice strategy for both (perspective person 1)
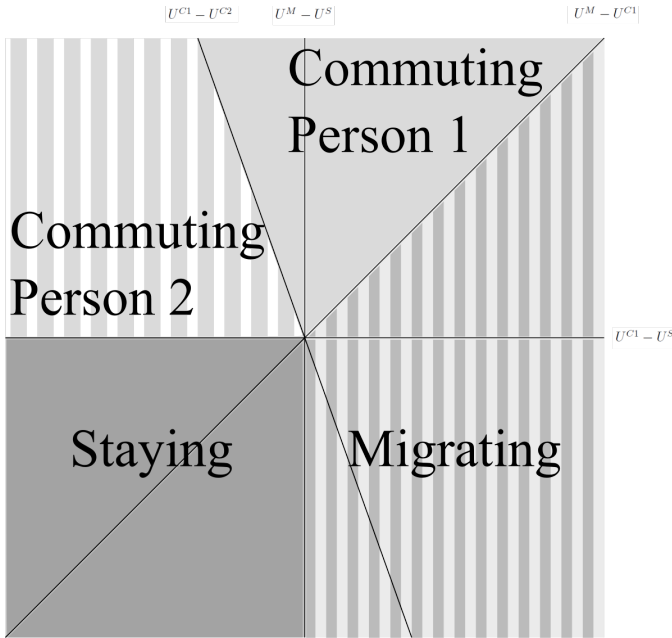
3.2.2   Empirical implications

The model developed above leads to three implications and hypotheses on family ties which can be tested empirically. While the model above is based on family migration decisions, the data set in this chapter comprises individual-level survey data. Therefore, in the following, hypotheses are derived that follow from the model above and are tested with individual data.

Firstly, if a family does comprise of more than two partners, i.e. children live in the household, the costs of both migrating or commuting are likely to increase ($k \uparrow$ and $c^1 \uparrow$, $c^2 \uparrow$). Children increase the costs of migration, k, as children have to migrate as well. As a result, children are taken out of their known social surroundings (friends, changing schools, etc.) and, depending on their age, informal child care through relatives gets more challenging. Children might also increase c^1 and c^2, especially if both commute, as child care gets more complex if one or both partners work abroad. Nivalainen (2004) suggests that families follow a family life-cycle and different age groups of children have different effects on the family's mobility. In particular children at school-age decrease the mobility of the family due

to children's ties to their school and social network, whereas preschool children are not bound to a location. One can, therefore, expect that costs of migrating are higher if children in school age are living in the household. It is reasonable to assume that the increase in k due to children is higher than the increase in c^1 and c^2.

H1: Children in the household make it more likely for the family to stay and less likely to be mobile. This effect is expected to be stronger for the likelihood of migrating than commuting.

Secondly, consider that the wage abroad and at home can be written as $w_a^i = b_a X^i$ and $w_h^i = b_h X^i$ with X^i comprising characteristics of individual i that proxy income, i.e. age, age^2 and educational level and b_a and b_h capture the returns to those characteristics in the country of origin and country of destination. Income differences between the country of origin and the country of destination are thus given by $w_a^i - w_h^i = (b_a - b_h)X^i$. Thus, wage differences are given by differences in the returns to educational level and experience in the country of origin and the country of destination. If one of the two partners stays, their income difference and the effect of the personal characteristics is zero, i.e. $w_h^i - w_h^i = 0$. Accordingly, the own educational level and age should not influence the decision to migrate vs. commute but the decisions to stay vs. migrate and stay vs. commute. Therefore, I expect that these own and partner characteristics impact the likelihood of the different mobility options.[2]

H2: The characteristics of the partner, i.e. the age and educational level, are expected to influence the mobility decision of an individual.

Thirdly, while children are expected to increase the costs of migrating and commuting, the partner's experiences with working abroad are expected to decrease the costs associated with mobility as it increases the information about the country of destination and the practicalities related to migrating and commuting.[3]

H3: If the partner is experienced in working abroad, an individual is less

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[2]As the data does not enable us to know the returns to the personal characteristics abroad and at home, I cannot test any hypothesis on the direction of the effect etc.

[3]It goes without saying that the same holds for the own experience working abroad. But as I am here talking about the hypotheses on family ties, I am only discussing the partner's experience working abroad.

likely to stay and more likely to migrate or commute.

3.3   Data and descriptive statistics

3.3.1   Data and methodology

The data used in this chapter is the FAMO (Fachkräftemonitoring) data set of the Austrian Institute of Economic Research (WIFO). In two waves people were approached in face-to-face interviews and asked, among others, about their mobility intentions and composition of their household. The survey was carried out in Vienna and the Slovakian border regions to Austria, i.e., Bratislava and Trnava between November 2008 and January 2009 (wave 1) as well as between September and November 2010 (wave 2). The data set is particularly suitable for the analysis as three densely populated areas, i.e. Vienna, Bratislava and Trnava, are very close to each other and, therefore, allow for both types of mobility to be likely to emerge (Huber and Nowotny, 2013).[4] Focusing on respondents between 18 and 64 who gave information about other household members and cleaning for missing observations, a data set with 6,009 observations is used of which 47.70 percent are in the first and 53.30 percent in the second wave.

The dependent variable, *mobility intentions*, is taken from Huber and Nowotny (2013). It is a categorical variable, which identifies the willingness of the respondent to migrate, commute or stay in the country of origin. Respondents were asked whether they would supposedly work abroad and in what manner.[5] Respondents who indicated to be willing to work abroad are encoded willing to be mobile. Accordingly, if they stated that it is not thinkable for them to work abroad they are listed as stayer, i.e. not willing to be mobile. Among those willing to be mobile, I differentiate between those that are willing to migrate and those that are willing to cross-border commute.[6]

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[4]Respondents could indicate in which country they would like to work. Among those indicating they are willing to be mobile 35 percent stated a bordering country of Austria or Slovakia as their preferred destination; mobility preferences where migrating as well as commuting are realistic options. In descending order, these countries are Germany (14.94 percent), Austria (8.23 percent), Italy (6.60 percent), Czech Republic (2.38 percent), Hungary (1.52 percent), Slovakia (0.97 percent), Slovenia (0.22 percent) and Poland (0.11 percent). Liechtenstein, Switzerland and Ukraine were not coded as countries in the data set and thus fall under 'other countries'.

[5]Respondents could choose whether they would prefer to commute daily, commute weekly, commute monthly or migrate (live and work abroad).

[6]If they indicated they prefer *monthly commuting* or *working abroad*, respondents were categorized as *willing to migrate*. If they stated *daily or weekly commuting* as their

Family characteristics are captured in a set of variables. I compare singles to individuals having a partner, on the one hand, and analyze the role of the partner's characteristics in mobility intentions on the other. In this chapter, a couple, i.e. having a partner, is defined as living together with the partner. Thus, they can be married as well as cohabiting. The partner's characteristics are captured via the educational level.[7] A set of variables is added to measure the partner´s experience and attitudes towards mobility, i.e. the partner's experience working abroad, whether the partner is currently working abroad or planning to work abroad.

Furthermore, the data set gives information about the number of children living in the household as well as their age.[8] Based on the suggestion of a family life-cycle by Nivalainen (2004), different age categories of the children are controlled for.

A set of control variables is included to account for other factors that influence mobility intentions; namely age, gender, respondent's educational level, German language knowledge, network abroad and mobility experience. Furthermore, time and country-specific effects are included in the analysis.

In the following, it is analyzed how the presence of children, a partner and the partner's characteristics influence mobility intentions using multinomial logit regressions. As illustrated in section 3.1, empirical studies on family migration found the husband's career and characteristics to be of higher importance for the family migration decision than the wife's. In this study, I look at the individual mobility intentions. Translating the finding of the family migration decision into the context of individual mobility intentions, it follows that the partner's characteristics might play a bigger role in the individual mobility decision of women than men. Accordingly, in the second part of the empirical analysis, the average marginal effects of the outcomes for men and women are contrasted. Given the still higher involvement of women in the care-taking of children, it is interesting to see whether the presence of children affects the mobility intentions of men differently than women.

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preferred mobility, they are classified as being *willing to commute*.

[7]In section 3.2.2 it is hypothesized that the educational level as well as the age of the partner influence the mobility intentions. However, the age of the partner is highly correlated with the age of the respondent and can therefore not be included in the analysis.

[8]In this chapter, the respondent's own children as well as the partner's children count as children in the household.

3.3.2   Descriptive statistics

Figure 3.3 and 3.4 show how mobility intentions differ by family character-istics. Mobility intentions are considerably lower among respondents with a partner as well as respondents with children compared to their single or childless counterparts. More than 80 percent of the respondents with a partner or children, respectively, indicate that they want to stay, which is about ten percentage points more than their counterparts. The share of respondents intending to migrate decreases by about half for those with a partner or with children. The share of respondents intending to commute decreases as well, with this decrease being higher when comparing those with a partner to single respondents than those with children to childless respondents.

Figure 3.3: Mobility intentions, with and without partner
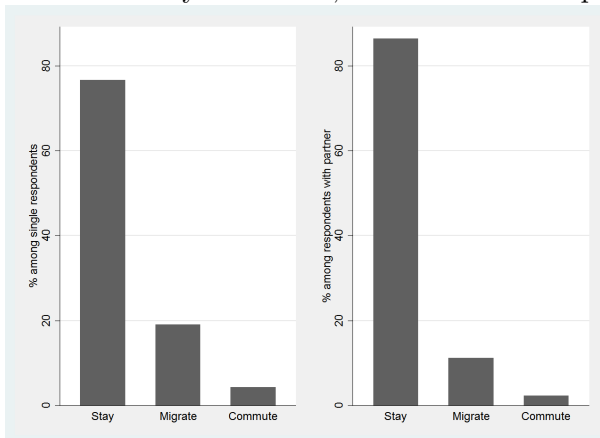
Figure 3.4: Mobility intentions, with and without children
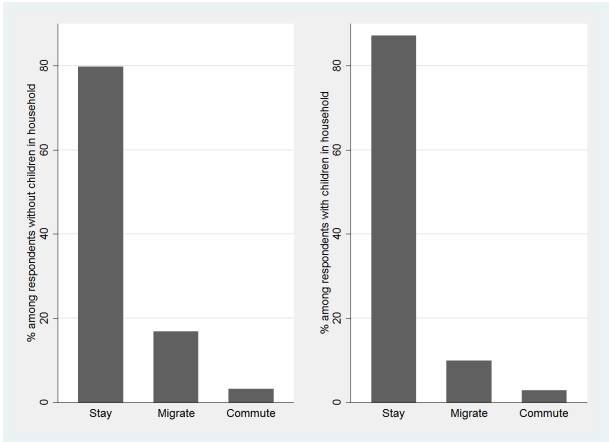
Table 3.1 provides the summary statistics for the variables used in the analysis. The majority of respondents are immobile, only 15.52 percent show migration intentions and 3.15 percent are intending to cross-border commute. Around one-third of the respondents have children. Among those who have children below 18, the children are rather equally distributed over the different age groups (children below 6, children between 7 and 12 and children between 13 and 17). In total, 58.13 percent of the respondents have a partner. Most of the respondents and most of the partners finished a secondary education. Nivalainen (2004) points out that if assortative mating would be present, i.e. the couple's education is highly correlated, it would interfere with the analysis. However, in the sample of this chapter the correlation between the educational level of the respondent and the partner is rather low (correlation coefficient: 0.371). Concerning the partner's experience with or attitude towards moving abroad, one can see that just as with the respondents themselves, also their partner are rather immobile. Around 17 percent of the partners have experience living abroad, 9 percent are planning to go abroad, and 1 percent is currently abroad.

Table 3.1: Summary statistics

Variable	Outcome	Obs.	%
Mobility intention	Stay	4,316	82.33
	Migrate	761	14.52
	Commute	165	3.15
Children	Yes	1,811	34.55
	No	3,431	65.45
Children, < 18	Yes	1,232	23.50
	No	4,010	76.50
Children, < 6	Yes	458	8.74
	No	4,784	91.26
Children, 7-12	Yes	530	10.11
	No	4,712	89.89
Children, 13-17	Yes	443	8.45
	No	4,799	91.55
Partner	Yes	3,047	58.13
	No	2,195	41.87
Education, partner	Primary	.128	4.20
	Secondary	2,188	71.83
	Tertiary	730	23.97
Experience abroad, partner	Yes	519	82.94
	No	2,523	17.06
Currently abroad, partner	Yes	57	1.09
	No	5,185	98.91
Planning to go abroad, partner	Yes	276	9.10
	No	2,758	90.90
Gender	Female	2,642	50.40
	Male	2,600	49.60
Education	Primary	765	14.59
	Secondary	3,393	64.73
	Tertiary	1,084	20.68
German language knowledge	Yes	373	7.12
	No	4,869	92.88
Networks abroad	Yes	2,720	51.89
	No	2,522	48.11
Previous mobility	Yes	664	12.67
	No	4,578	87.33
Age[*]		40.74	12.53

[*]Continuous variable and therefore reports the (1) mean
and (2) standard deviation

3.4 Results

3.4.1 Without partner characteristics

Table 3.2 reports the results from the multinomial logistic regressions in average marginal effects. The three specifications differ on the level of details with which the presence of children in the household is captured. In the first specification, a variable is included that controls for children living in the household independent from their age. The second specification focuses on children below 18 and in the last specification children under 18 are divided into three different age groups, i.e. children in pre-school age, primary school age and secondary school age.

The results of table 3.2 suggest that family ties matter, with a strong effect of having a partner and a smaller effect of the presence of children. Across all specifications, having children decreases the likelihood to migrate. In specification 1, children furthermore increase the likelihood to stay and to commute. Specification 1 thus partially confirms the hypothesis derived in section 3.2.2 that children make a respondent more likely to intend to stay and less likely to intend to migrate. In specification 2, children below 18 make the respondent also less likely to migrate. When looking at different age categories of children (specification 3), children between 13 and 17 have no effect on mobility intentions. Children under six decrease the likelihood that respondents intent to migrate and children between 7 and 12 increase the likelihood of intentions to stay and decreases the likelihood of intentions to migrate. Accordingly, while very young children and children in primary school age affect the parent's mobility intentions, under-aged children already in secondary education do not. Whereas Nivalainen (2004) hypothesized that school-children decrease mobility and preschool children do not affect it, the results indicate that more dependent children affect mobility intentions and children in secondary school age do not. This might be since households with younger children themselves need to rely more on a social network (e.g. informal childcare through relatives) than families with older, less dependent children. Migrating with children seems to be much more costly than migrating without. Therefore, children make anyone, independent of being a single parent or in a two partner household, less likely to intend to migrate.

Being in a relationship and living together clearly reduces the mobility intentions. Respondents with a partner are more likely to intend to stay and less likely to intend to migrate or commute. The coefficient for commuting

Table 3.2: Average marginal effects

VARIABLES	Specification 1			Specification 2			Specification 3		
	(1) Stay	(2) Migrate	(3) Commute	(1) Stay	(2) Migrate	(3) Commute	(1) Stay	(2) Migrate	(3) Commute
Children	0.023**	-0.036***	0.013*	-	-	-	-	-	-
	(0.011)	(0.010)	(0.007)						
Children, <18	-	-	-	0.015	-0.023**	0.007	-	-	-
				(0.012)	(0.011)	(0.007)			
Children, < 6	-	-	-	-	-	-	0.022	-0.025*	0.003
							(0.016)	(0.015)	(0.010)
Children, 7-12	-	-	-	-	-	-	0.036**	-0.042***	0.006
							(0.017)	(0.015)	(0.010)
Children, 13-17	-	-	-	-	-	-	-0.002	-0.005	0.007
							(0.019)	(0.018)	(0.012)
Partner	0.072***	-0.051***	-0.021***	0.075***	-0.057***	-0.019***	0.073***	-0.055***	-0.018***
	(0.010)	(0.009)	(0.005)	(0.010)	(0.009)	(0.005)	(0.010)	(0.009)	(0.005)
Age	0.004***	-0.003***	-0.001**	0.004***	-0.003***	-0.001*	0.004***	-0.003***	-0.001*
	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Female	0.027***	-0.004	-0.023***	0.028***	-0.005	-0.022***	0.026***	-0.004	-0.022***
	(0.009)	(0.009)	(0.005)	(0.009)	(0.009)	(0.005)	(0.009)	(0.009)	(0.005)
Education, secondary	0.003	0.004	-0.007	0.003	0.004	-0.007	0.003	0.004	-0.007
	(0.014)	(0.012)	(0.007)	(0.014)	(0.012)	(0.007)	(0.014)	(0.012)	(0.007)
Education, tertiary	-0.038**	0.040***	-0.002	-0.038**	0.040***	-0.002	-0.038**	0.040***	-0.002
	(0.016)	(0.015)	(0.009)	(0.016)	(0.015)	(0.009)	(0.016)	(0.015)	(0.009)
German language knowledge	-0.094***	0.087***	0.007	-0.094***	0.087***	0.007	-0.094***	0.087***	0.007
	(0.024)	(0.024)	(0.012)	(0.024)	(0.025)	(0.011)	(0.024)	(0.015)	(0.012)
English language knowledge	-0.0512***	0.048***	0.004	-0.052***	0.048***	0.004	-0.051***	0.048***	0.004
	(0.011)	(0.010)	(0.006)	(0.011)	(0.010)	(0.006)	(0.011)	(0.010)	(0.006)
Networks abroad	-0.115***	0.089***	0.026***	-0.115***	0.089***	0.026***	-0.115***	0.089***	0.026***
	(0.010)	(0.009)	(0.005)	(0.010)	(0.009)	(0.005)	(0.010)	(0.009)	(0.005)
Previous mobility	-0.1546***	0.1390***	0.0155*	-0.1551***	0.1397***	0.0154*	-0.1539***	0.1384***	0.0155*
	(0.0158)	(0.0149)	(0.0081)	(0.0158)	(0.0149)	(0.0080)	(0.0157)	(0.0148)	(0.0080)
Observations	5,242	5,242	5,242	5,242	5,242	5,242	5,242	5,242	5,242

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1, dummies for wave and country where the survey was taken are added; reference category for education is primary education

intentions is lower than that for migration intentions, which might reflect that in cross-border commuting the partner does not have to relocate and is therefore not necessarily forced to be a tied mover.

The size, significance, and magnitude of the control variables remain constant across all specifications. The age of the respondent decreases the likelihood of intentions to migrate or commute and increases the likelihood of intentions to stay. Gender affects staying as well as commuting intentions, with women being more likely to intend to stay and less likely to intend to commute than men. While secondary education does not differently affect mobility intentions than primary education, tertiary education does. Respondents with tertiary education are less likely to stay and more likely to migrate than respondents with primary education. This finding is in line with the finding that migrants tend to be positively selected. Being able to speak German or English decreases the likelihood of staying and increases the likelihood of migrating. However, it does not affect the likelihood to commute. Networks abroad and previous experience of the respondent in going abroad clearly increases mobility intentions. Both variables decrease the likelihood of intentions to stay and increase the likelihood of migration or commuting intentions.

3.4.2   With partner characteristics

In order to look at the effect of family ties more in detail, I add a set of variables that capture characteristics of the partner with whom the respondent lives together. This set of variables consists of the partner's highest educational level and variables which capture the mobility experience and mobility intentions of the partner; i.e. whether the partner has experience working abroad, currently lives abroad or plans to move abroad. In the following, it is analyzed whether characteristics of the partner affect the mobility intentions of the respondents. Thus, the analysis in this section is restricted to respondents in two-partner families who live in the same household.

As for the results without partner characteristics, table 3.3 reports the multinomial logistic regression results in average marginal effects where the three specifications differ by how the presence of children in the household is captured.

When comparing the effects of children on the likelihood of migration intentions among families, having children still reduces the likelihood of migrating and increases the likelihood of commuting in specification 1, but no longer affects the likelihood of staying. Children below 18 in specifica-

tion 2 show no effect on mobility intentions and in specification 3 solely children between 7 and 12 decrease the likelihood of migrating. Thus, the data only provides weak evidence that the presence of children in families increases the likelihood of staying and decreases the likelihood of migrating and commuting.

According to hypothesis 2 in section 3.2.2, it is expected that the educational level of the partner affects mobility intentions. However, the results below do not provide any evidence for this. If the partner finished secondary or tertiary education, the likelihood of mobility intentions is not different from respondents whose partner finished primary education.

However, the partner's attitude towards mobility affects mobility intentions. If the partner plans to work abroad, this decreases the likelihood of being willing to stay and increases the likelihood of intentions to migrate or commute.

As in the analysis without partner characteristics, networks and respondent's experience are important for the mobility decision. The effects of both variables remain the same and are constant across all specifications. Merely the likelihood of intentions to commute is no longer affected by the previous mobility experience of the respondent. When analyzing families, age has the same effect on intentions to stay or migrate but not longer affects the likelihood to intend to commute. The positive selection visible in the increased likelihood of mobility intentions for tertiary education compared to primary education does not hold when looking only at two-parent families. While speaking English has the same effect on respondent´s in two-parent families, speaking German gets less important and only increases the likelihood to intend to migrate.

Table 3.3: Average marginal effects, including partner characteristics

	Specification 1			Specification 2			Specification 3		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
VARIABLES	Stay	Migrate	Commute	Stay	Migrate	Commute	Stay	Migrate	Commute
Children	0.010	-0.024**	0.014**	-	-	-	-	-	-
	(0.011)	(0.010)	(0.006)						
Children, <18	-	-	-	0.003	-0.013	0.010	-	-	-
				(0.012)	(0.011)	(0.007)			
Children, < 6	-	-	-	-	-	-	0.016	-0.020	0.004
							(0.015)	(0.013)	(0.009)
Children, 7-12	-	-	-	-	-	-	0.020	-0.031**	0.010
							(0.015)	(0.014)	(0.010)
Children, 13-17	-	-	-	-	-	-	-0.001	-0.004	0.005
							(0.017)	(0.016)	(0.009)
Education, partner, secondary	-0.012	0.004	0.008	-0.012	0.003	0.008	-0.011	0.003	0.008
	(0.022)	(0.021)	(0.011)	(0.022)	(0.021)	(0.011)	(0.022)	(0.021)	(0.011)
Education, partner, tertiary	-0.016	0.017	-0.001	-0.016	0.016	-0.001	-0.016	0.017	-0.001
	(0.024)	(0.023)	(0.012)	(0.024)	(0.024)	(0.012)	(0.024)	(0.024)	(0.012)
Experience abroad, partner	0.019	-0.011	-0.008	0.020	-0.011	-0.008	0.019	-0.011	-0.008
	(0.013)	(0.013)	(0.006)	(0.013)	(0.013)	(0.006)	(0.013)	(0.013)	(0.006)
Currently abroad, partner	0.022	-0.015	-0.007	0.022	-0.015	-0.007	0.024	-0.017	-0.007
	(0.025)	(0.024)	(0.012)	(0.025)	(0.024)	(0.012)	(0.025)	(0.024)	(0.012)

Planning to go abroad, partner	-0.173***	0.149***	0.024*	-0.174***	0.151***	0.023*	-0.173***	0.150***	0.023*
	(0.025)	(0.023)	(0.013)	(0.025)	(0.023)	(0.013)	(0.024)	(0.023)	(0.012)
Age	0.001**	-0.001***	0.000	0.001**	-0.001***	0.000	0.001***	-0.001***	0.000
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)
Female	0.034***	-0.018*	-0.016***	0.033***	-0.018*	-0.015***	0.033***	-0.017*	-0.015***
	(0.011)	(0.010)	(0.005)	(0.011)	(0.010)	(0.005)	(0.011)	(0.010)	(0.005)
Education, secondary	0.008	-0.000	-0.008	0.008	-0.001	-0.007	0.008	-0.001	-0.007
	(0.015)	(0.014)	(0.009)	(0.015)	(0.014)	(0.009)	(0.015)	(0.014)	(0.009)
Education, tertiary	-0.010	0.013	-0.003	-0.010	0.012	-0.002	-0.010	0.012	-0.003
	(0.018)	(0.017)	(0.011)	(0.018)	(0.017)	(0.011)	(0.018)	(0.017)	(0.011)
German language knowledge	-0.062	0.077*	-0.014	-0.062	0.077*	-0.014	-0.0624	0.077*	-0.014
	(0.042)	(0.043)	(0.010)	(0.043)	(0.043)	(0.010)	(0.042)	(0.0432)	(0.010)
English language knowledge	-0.040***	0.030***	0.010*	-0.041***	0.031***	0.010*	-0.040***	0.031***	0.010*
	(0.012)	(0.012)	(0.006)	(0.012)	(0.012)	(0.006)	(0.012)	(0.012)	(0.006)
Networks abroad	-0.075***	0.053***	0.022***	-0.075***	0.053***	0.022***	-0.074***	0.053***	0.022***
	(0.012)	(0.011)	(0.006)	(0.012)	(0.011)	(0.006)	(0.012)	(0.011)	(0.006)
Previous mobility	-0.084***	0.078***	0.006	-0.084***	0.078***	0.006	-0.083***	0.0762***	0.007
	(0.017)	(0.017)	(0.008)	(0.017)	(0.017)	(0.008)	(0.017)	(0.016)	(0.008)
Observations	3,033	3,033	3,033	3,033	3,033	3,033			

Standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$, dummies for wave and country where the survey was taken are added;

reference category for education of respondent as well as partner is primary education

3.5   Gender differences

Previous research has shown that women tend to be less mobile than men. This finding may be due to different employment characteristics as well as differences in family responsibilities (see section 3.2). If the immobility is partly due to the latter reason, it also means the family ties are most likely stronger for women than men within the mobility decision. In the following it is therefore analyzed whether family ties have a different effect on men and women in the sample. In order to compare the results for men and women, the average marginal effects at the different outcomes for male and female are contrasted. Accordingly, I look at the average derivatives for each of the three outcomes (stay vs. migrate vs. commute) with respect to the family ties at each gender outcome (male vs. female). To do so, I use the same multinomial logit regressions as above, including interaction effects of gender with each of the variables on having a partner, their characteristics, and children.

When looking at the results not restricted on families in table 3.4, some gender differences in variables that capture family ties can be observed.

Having a partner, which is an important variable in the analysis of the total sample in table 3.2, does not affect men or women differently concerning their intentions to stay or migrate. However, when looking at the commuting decision, having a partner makes women more likely to intend to commute than men and the effect is robust across all three specifications.

The presence of children in the household decreases the likelihood of mobility intentions more for women than men, reflected in an increased likelihood of women to stay and a decreased likelihood of women to commute. Yet, the willingness to migrate does not show differences between genders. Only in specification 3 does having children between 7 and 12 increase the likelihood of intending to stay more for women than men. Having children decreases the likelihood to intend to commute more for women than men in specification 1 and 2.

In table 3.5 characteristics of the partner are again included and thereby analyze gender differences in mobility intentions within families. While the presence of children continues to play a role with nearly the same sign and significance as when not only two-parent families were included, the partner's characteristics show no gender-specific effects.

Having children (specification 1), children below 18 (specification 2) and children between 7 and 12, if several under-aged categories are included (specification 3), increases the intentions to stay relatively more for women than men. Furthermore, women with children are less likely to intend to

Table 3.4: Contrast estimates of gender differences by family ties

		Specification 1 Female vs. Male	Specification 2 Female vs. Male	Specification 3 Female vs. Male
Stay	Partner	-0.010	-0.013	-0.009
	Children	0.037*	-	-
	Children, < 18	-	0.053**	-
	Children, < 6	-	-	0.015
	Children, 7-12	-	-	0.065**
	Children, 13-17	-	-	0.045
Migrate	Partner	-0.019	-0.010	-0.013
	Children	0.004	-	-
	Children, < 18	-	-0.027	-
	Children, <6	-	-	0.006
	Children, 7-12	-	-	-0.050*
	Children, 13-17	-	-	-0.016
Commute	Partner	0.029**	0.023**	0.022**
	Children	-0.032**	-	-
	Children, < 18	-	-0.026*	-
	Children, < 6	-	-	-0.020
	Children, 7-12	-	-	-0.015
	Children, 13-17	-	-	-0.028
	Observations	5,242	5,242	5,242

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Calculations based on multinomial logistic regression models with interaction terms on gender and family ties, controlling for the variables included in the multinomial logistic regression section 3.4.

Table 3.5: Contrast estimates of gender differences by family ties, including partner characteristics

		Specification 1 Female vs. Male	Specification 2 Female vs. Male	Specification 3 Female vs. Male
Stay	Education partner, secondary	0.011	0.003	0.001
	Education partner, tertiary	-0.002	-0.002	-0.033
	Reference category: Education partner, primary			
	Experience abroad, partner	-0.028	-0.027	-0.027
	Currently abroad, partner	0.019	-0.023	0.022
	Planning to go abroad, partner	-0.025	-0.026	-0.028
	Children	0.039*	-	-
	Children, < 18	-	0.054**	-
	Children, < 6	-	-	0.031
	Children, 7-12	-	-	0.055*
	Children, 13-17	-	-	0.018
Migrate	Education partner, secondary	-0.010	-0.010	0.014
	Education partner, tertiary	-0.006	-0.004	-0.000
	Reference category: Education partner, primary			
	Experience abroad, partner	0.019	0.019	0.019
	Currently abroad, partner	-0.015	-0.018	-0.017
	Planning to go abroad, partner	0.009	0.006	0.007
	Children	-0.017	-	-
	Children, < 18	-	-0.038*	-
	Children, < 6	-	-	-0.013
	Children, 7-12	-	-	-0.055**
	Children, 13-17	-	-	-0.004
Commute	Education partner, secondary	-0.011	-0.013	-0.014
	Education partner, tertiary	0.008	0.006	0.004
	Reference category: Education partner, primary			
	Experience abroad, partner	0.009	0.009	0.008
	Currently abroad, partner	-0.004	0.005	-0.005
	Planning to go abroad, partner	0.015	0.019	0.022
	Children	-0.021***	-	-
	Children, < 18	-	-0.016	-
	Children, < 6	-	-	-0.018
	Children, 7-12	-	-	-0.000
	Children, 13-17	-	-	-0.015
	Observations	3,033	3,033	3,033

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Calculations based on multinomial logistic regression models with interaction terms on gender

and family ties, controlling for the variables included in the multinomial logistic regression in section 3.4.

commute than men with children in specification 1 and 2 and less likely to intend to commute when the children are between 7 and 12 in specification 3.

The partner's intention to move abroad, which was found important for mobility intentions in general, does not show differences between male and female respondents.

The contrasts of gender differences in family ties show that, when the total sample is considered as well as within two-parent families, the presence of children decreases the likelihood of mobility intentions more for women compared to men. The effect of having a partner (table 3.4) or the partner's characteristics (table 3.5), however, do not differ between gender. The absence of gender differences concerning the effect of having a partner on the likelihood of intentions to migrate or stay, may be caused by a more equal evaluation of the partner's characteristics (see discussion in section 3.1).

3.6   Conclusion and discussion

Despite the EU's goal of encouraging cross-border mobility, migration and cross-border commuting rates within the EU remain rather low, which might be explained by the high costs associated with cross-border mobility. The costs of cross-border mobility are particularly high for attached individuals, i.e. people with a partner or children.

In this chapter, the role of family ties as determinants of mobility intentions is analyzed. The mobility decision of a two-person household, i.e. family mobility, is modeled and it is shown under which conditions the household decides to stay, to migrate or have one or both household members cross-border commute.

In an empirical analysis, I analyze individual survey data on mobility intentions in border regions of Austria and Slovakia and look at the effect of family ties on the likelihood of intentions to stay, cross-border commute or migrate. The findings suggest that family ties matter to some extent, with a strong effect of having a partner, a somewhat smaller effect of children and little effect of the partner's characteristics. Looking at the total sample, it is found that being in a relationship clearly reduces mobility intentions as respondents with a partner are more likely to stay and less likely to cross-border commute or migrate. Children particularly reduce the likelihood to migrate and, among under-aged children, those below thirteen seem to be more important for the mobility intentions.

In order to include more specific partner characteristics, mobility intentions of respondents in two-partner households are analyzed. While, based on the model, an effect of the partner's education on the mobility intentions was expected, the empirical analysis provides no evidence for that. Concerning the partner's attitude and experience of working abroad, the partner's plan to work abroad affects the migration decision as it decreases the likelihood of intention to stay and increases the likelihood of intentions to cross-border commute or migrate.

Finally, gender differences are considered, as previous research shows that women tend to be less mobile than men, which may also be caused by differences in family responsibilities. The results suggest that the presence of children differently affects mobility intentions of women and men, with women being more likely to stay and less likely to commute than men. Having a partner or partner characteristics do not show gender-specific differences.

In the model of this chapter, mobility decisions are joint family decisions. Due to the nature of the data set, only certain implications of the model could be tested on an individual level. Future research should use the family as the unit of analysis to see how the mobility decision of families compares to those of individuals. As the country selection in this chapter was mainly data-driven, it would be interesting to expand the analysis to other border areas throughout Europe. One could expand the analysis to countries with less considerable income differences, such as Germany and the Netherlands, to see whether the determinants of mobility intentions are different between those country pairs.

To my knowledge, this is the first study including cross-border commuting as a type of mobility when looking at the role of family ties on mobility considerations. More research is needed to place the findings of this chapter in a wider debate on the effects of family ties on cross-border mobility including cross-border commuting.

This chapter highlights the role of family ties in cross-border mobility intentions and the findings imply that policy makers should take family ties into account when designing their policies in order to foster Intra-EU migration. The results of this paper suggest that cross-border mobility decisions are mutual decisions where a partner can always 'veto' by staying. Once a two-partner household reaches a joint decision, children and the associated costs of moving the children further decrease the likelihood of cross-border migration. Investment in international schools and EU-wide regulations on the transferability of education could reduce the costs of relocation with children. If the EU wants to increase labor mobility to foster economic

growth, cross-border commuting would be a good alternative as it implies that the partner may continue to work and live in the country of origin. However, the data in this paper illustrates that only a minority intends to cross-border commute. More research on cross-border commuting would be needed to design policies that make cross-border commuting more attractive such as decreasing travel costs or improving bilateral agreements on social security. As the latest economic survey of the EU by OECD (2016) reports significant barriers in pension portability, this would be a starting point to fully enable social security portability.

Chapter 4

Educational mismatches for second generation immigrants. An analysis of applied science graduates in the Netherlands

4.1 Introduction

Educational mismatches refer to differences between the education attained and required for a job. Educational mismatches are divided into vertical and horizontal mismatches. Vertical mismatches are mismatches in the level of education.[1] Thus, the level of education is higher than required for the job. Horizontal mismatches are mismatches in content. Thus, the field of education does not match the job. Mismatches, and in particular overeducation, can be seen as a huge "brain waste" as the returns to education tend to be lower than for those workers that are correctly matched (Landesmann et al., 2015). Previous evidence shows that mismatches have a negative effect on job satisfaction (Allen and Van der Velden, 2001; García-Espejo and Ibáñez, 2005; Allen and De Weert, 2007) and earnings (Hartog, 2000;

The study presented in this chapter is joint work with Christoph Meng and Romy Nollen and has been published as ROA research memorandum.

[1]Vertical mismatches can be divided into over- and undereducation where overeducation refers to a level of education higher than required and undereducation to a level lower than required. In this chapter, we focus on the effects of overeducation. If we talk about vertical mismatches, we refer to overeducation.

Leuven and Oosterbeek, 2011), the effect on earnings even being stronger for immigrants than natives (Joona et al., 2014).

While other determinants of educational mismatches – such as age, school performance, work experience or occupation-specific characteristics – have been analyzed widely, the relationship between immigrants and the incidence of these mismatches has not received a lot of attention (Leuven and Oosterbeek, 2011), even though research on this topic has been recently increasing. As immigrants are often found to show worse labor market outcomes and suffer ethnic penalties, e.g. in unemployment and wages (see e.g. Nekby, 2002; Amuedo-Dorantes and De la Rica, 2007; Algan et al., 2010; Dustmann and Frattini, 2011; Basilio et al., 2014; Uhlendorff and Zimmermann, 2014), it might be that they also show higher probabilities of experiencing educational mismatches.

In this chapter, we analyze whether being a second generation (western or non-western) immigrant influences the probability of being mismatched and the type of mismatch experienced. We define second-generation immigrants as people born in the Netherlands with at least one of their parents born abroad. Additionally, we include unemployment as another possible outcome in the labor market. We thereby contribute to the existing literature in two ways.

Firstly, we look at a very homogeneous group of natives and immigrants. We compare second generation immigrants and Dutch natives who graduated in an applied science study in the Netherlands. Thus, we compare individuals who are born in the same country, grew up in the same educational system and graduated with the same educational degree. Therefore, possible differences in mismatches between immigrants and natives are not caused by differences in the quality of the education and to a lesser extent by language difficulties as they all graduated from the same educational system (McGuinness and Byrne, 2015). Only a few studies, i.e. Lindley (2009), Nielsen (2011) and McGuinness and Byrne (2015) have followed this approach. If, after controlling for other factors, a difference between second generation immigrants and natives persists, it is called an ethnic penalty and might either be due to discrimination (Visintin et al., 2015) or unobservable differences in ability. If discrimination is present and, thus, immigrants experience difficulties finding a matching job, they might either be more prone to take a job that does not correctly correspond with their qualifications (McGuinness and Byrne, 2015) or need a higher education for the same job to counter this effect (Piracha and Vadean, 2013).

Secondly, previous research on the determinants of overeducation focused on mismatches in level, i.e. vertical mismatches (Hartog, 2000; Robst,

2007). To our knowledge, this is the first study that analyzes the relationship between immigrant status and educational mismatches not focusing solely on vertical mismatches but also on horizontal and double mismatches. Horizontal mismatches may be a problem if occupation-specific skills cannot be transferred to other occupations (Robst, 2007).

Using a pooled cross-sectional data set among recent applied science graduates in the Netherlands between 2006 and 2014, we investigate whether an ethnic penalty in labor market outcomes exists. Specifically, we analyze whether the immigrant status, i.e. Dutch native, western immigrant, and non-western immigrant, influences the likelihood of being mismatched or unemployed. The results of our multinomial logit regression suggest that an ethnic penalty in educational mismatches and unemployment exists, being stronger for non-western than western immigrants.

This chapter is organized as follows. Section 4.2 provides an overview of the economic theory and empirical evidence concerning the determinants of educational mismatches in general and the effect of being an immigrant on such a mismatch in particular. In section 4.3 we describe the data and methodology used in this paper and provide some descriptive statistics, followed by the results in section 4.4. Section 4.5 provides conclusions.

4.2 Education-job mismatches

4.2.1 The transitions from school to work

4.2.1.1 Theory

In the transition from school to work, the match between education and occupation is crucial. Choices made at the beginning of a career may have long-term effects for the employee due to hysterisis. Suboptimal matches between occupation and graduates may not allow graduates to keep abreast of developments with respect to their core competencies in which they invested (Meng, 2006). The process that matches heterogenous graduates to heterogenous jobs within this transition period has received a lot of attention in the theoretical literature (see e.g. Jovanovic, 1979, 1984; Barron and Loewenstein, 1985, Topel, 1986). If the education-job match is not optimal, additional learning by training and job experience are needed to improve or adjust the intital competences acquired during education (Barron and Loewenstein, 1985; Van Smoorenburg and Van der Velden, 2000; Wolbers, 2003; Badillo-Amador et al., 2005). Indeed the importance to improve or adjust the initial competencies acquired in education has long

been emphasized (Becker, 1964; Lynch, 1992; Acemoglu and Pischke, 1998; Pischke, 2001). Additionally, education-job mismatches provide incentives to change jobs (Allen and Van der Velden, 2001; Wolbers, 2003) as job mismatches form an important cause of job dissatisfaction (see e.g. Burris 1983; Tsang and Leving 1985).

Different economic theories can help to understand the role education plays during the transition stage and the occurence of a possible mismatch between education and occupation.

Firstly, following the human capital theory, Allen and De Weert (2007) explain that the human capital acquired through education makes graduates more productive in their jobs. Acquiring human capital is done via different channels, of which formal education is the main one. This means that schooling can widen or compress differences in levels of competences. If the education-job match is not optimal, additional learning by training and job experience are needed to improve or adjust the initial competences acquired during education (Badillo-Amador et al., 2005).

Secondly, the searching and matching theory explains overeducation as a temporary situation, caused by imperfect information which disappears with experience in the labor market (Hartog, 2000).

Thirdly, the assignment theory focuses on the demand side of the labor market, where there is an optimal allocation when the most qualified worker is assigned to the most complex job, and vice versa. Accordingly, in inefficient labor markets, mismatches can occur because of asymmetric information and search costs.

Fourthly, the technological change theory may explain overeducation in countries with technologically dynamic economics (Hartog, 2000). Educational degrees adjust to technological changes in a country and therefore cohorts that require these skills recently, are considered overeducated compared to earlier cohorts (De Oliveira et al., 2000).

Lastly, the screening theory treats education purely as a signal of unobserved ability (Hartog, 2000). Accordingly, overeducation should not occur right after graduation but more with time in the labor market when employers account for on-the-job performance in their promotion decisions.

4.2.1.2 Empirical evidence

Next to asymmetric information or search costs, different determinants of educational mismatches have been discussed in the empirical literature.[2]

Firstly, previous research addressed the effect of individual characteristics on the occurrence of mismatches. Concerning gender, no coherent proof is found, in some studies being female increases the likelihood of obtaining a match in level, and in other studies, there is no difference between females and males (Bourdabat and Chernoff, 2012). Wolbers (2003) finds that male graduates have bigger chances of obtaining a vertical mismatch and that the probability of a vertical mismatch is increasing with age. Other individual characteristics on school performance and resume building also affect the chance of being mismatched. Building up your resume before working results in a smaller chance of experiencing a mismatch. Mason et al. (2009) find that work experience has a positive effect on the ability of graduates secure employment in 'graduate-level' jobs. Additionally, grades affect the match in a significant way, with a higher grade ensuring a better match in level (Bourdabat and Chernoff, 2012). Lastly, work experience is another individual characteristic that has been found to positively affect the likelihood to be correctly matched (Bourdabat and Chernoff, 2012).

Secondly, sector-specific characteristics have a strong influence on the occurrence of mismatches, both on vertical and horizontal mismatches. The existing literature makes a distinction between general and specific education, in which occupation-specific competencies can provide students with a sound basis to start on the labor market, and may result in less experienced discrepancies between demanded and available skills at the beginning of one's career. On the other hand, education can provide students with competencies for further development of their skills, teaching more generic and reflective competencies. For these graduates, differences between actual and required skills will decrease over time (Allen and De Vries, 2007). Heijke et al. (2003) find that graduates from occupation-specific programs are more likely to experience a match in content than those in the more general programs. Bourdabat and Chernoff (2012) specify this stating that educational characteristics strongly influence the match, with field specific programs such as health and education showing the least horizontal mismatches.

Lastly, macroeconomic variables have an effect on the occurrence of mismatches. Wolbers (2003) finds that high unemployment rates result in the

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[2]The literature review here focuses on educational mismatches. Previous research (e.g. Carmichael and Woods, 2000) suggests that those factors also determine the probability of unemployment.

occurrence of more horizontal as well as vertical mismatches. Birchenall (2010) finds that, since unemployment rates differ between sectors, episodes of high unemployment or high vacancies are accompanied by high cross-sectional dispersion.Thus, the occurrence of mismatches differs by sector.

4.2.2   Education-job mismatches and immigrants

4.2.2.1   Theory

Chiswick and Miller (2009) review economic theories of educational mismatches for implications of differences between immigrants and natives. Due to differences in language capability and educational qualifications, human capital cannot be perfectly transferred across borders, which puts immigrants in a relatively worse position than natives (Piracha and Vadean, 2013). The search and adjustment process, which causes the temporary overeducation in the job search theory, can be expected to be of particular importance for immigrants from origin countries that are very different to the country of destination (Chiswick and Miller, 2009). Education acquired abroad most likely only imperfectly works as a signal and therefore increases the incidence of overeducation for immigrants who hold a foreign diploma.

The assignment theory, as well as the technological change theory, cannot account for possible differences between natives and immigrants.

It should be noted that the explanations for differences in overeducation for immigrants and natives, suggested by Chiswick and Miller (2009), only applies to first-generation immigrants and often only to those that recently arrived. Therefore, these arguments do not apply to our paper as we look at second generation immigrants who obtained the same educational degree as natives.

Piracha and Vadean (2013) offer another explanation that can apply to second-generation immigrants as well as first-generation immigrants. That is, immigrants might be subject to discrimination and accordingly need a higher education for the same job to counter the disadvantaged position caused by discrimination.

4.2.2.2   Empirical evidence

Most studies that analyze the incidences of educational mismatches for immigrants find that skill mismatches are higher among immigrants than natives (Battu and Sloane, 2002; Green et al., 2007; Wald and Fang, 2008;

Chiswick and Miller, 2008; Visintin et al., 2015). Green et al. (2007) analyze vertical mismatches in Australia and find that immigrants are more likely to be mismatched than natives, with the mismatch probability being even higher for immigrants from countries with non-English speaking background. Wald and Fang (2008), as well, find a lack of language capability to increase the likelihood of a mismatch. Using data on workers in Canada, they find that immigrants are more likely to be overeducated and this likelihood is higher for immigrants from non-English and non-French speaking backgrounds. Chiswick and Miller (2008) analyze the incidence of a vertical mismatch for high-skilled men in the United States and find that it is higher for immigrants than their native counterparts.

While the studies above refer to country studies, Visintin et al. (2015) analyze vertical mismatches across countries. They find that the result of increased likelihood of overeducation for immigrants holds across countries. Using survey data from 86 countries they, furthermore, find that the effect differs by destination-origin country combinations: African immigrants are always more likely to be overeducated; EU-15 immigrants are more likely to be overeducated when immigrating to another EU-15 country but less likely otherwise; and Central and South American immigrants are more likely to be overeducated in any of the EU-27 countries but less likely in Asia, Africa and Central and South America. Visintin et al. (2015) furthermore find some evidence that second-generation immigrants are more likely to be overeducated.

Studies that focus on second-generation immigrants and are able to differentiate between first- and second-generation immigrants specifically are Battu and Sloane (2002), Joona et al. (2014) and Nielsen (2011). Battu and Sloane (2002) analyze differences in the likelihood of overeducation for ethnic groups in the United Kingdom. They find that only certain non-white ethnic minorities, i.e., Indians, Africans and Chinese face a higher risk of overeducation than Whites. Joona et al. (2014) find an increased probability of overeducation for all immigrants with the probability being even higher for immigrants from regions from which Sweden received a lot of refugees, i.e. Africa, South America and Asia. Expanding the analysis to state dependence in overeducation, they furthermore show that this as well is higher for immigrants than for natives. Nielsen (2011) finds a higher incidence of overeducation for immigrants in Denmark. Controlling for the country at which an immigrant obtained their education, they find that being educated in Denmark reduces the risk of overeducation for immigrants.

A study that compares immigrants and natives who have the same educational qualification is Lindley (2009). Analyzing the likelihood of overeducation among graduates in Great Britain, Lindley (2009) finds that Black

African, other non-white and Indian men, as well as Indian and Pakistani/Bangladeshi women, are more likely to be overeducated than their native counterparts.

Piracha et al. (2012) analyze vertical mismatches for immigrants without comparing them to their native counterparts. Using survey data from immigrants coming to Australia, they analyze the determinants of mismatches for immigrants. They find that being mismatched in the country of origin increases the probability to experience a mismatch in Australia.

Educational mismatch always refers to formal skills, even though skills may also be gained by informal means, i.e. on-the-job experience. Some authors, therefore, suggest that looking at skill mismatches instead would be a more suitable measure of a mismatch (McGuinness and Byrne, 2015). However, skills are harder to measure (Visintin et al., 2015). A study that analyzes skill mismatches and the effect of immigrant status is McGuinness and Byrne (2015). Studying immigrants who graduated from university in the EU-15 countries, they find only weak evidence that overeducation is higher amongst immigrants compared to natives. However, they find a higher incidence of over-skilling arises among female immigrants with short durations of domicile. It should be noted that they analyze immigrants in tertiary education, and previous research shows that ethnic penalties in labor market outcomes are decreasing in educational level (Nielsen, 2011).

Heath et al. (2008) reviewed country-studies on unemployment incidences for immigrants. They conclude that, across all countries, immigrants experience an ethnic penalty in unemployment, i.e. they have a higher risk of unemployment compared to their native counterparts.

4.3   Data and methodology

The data used in this study is the *applied science monitor*. The applied science monitor is an annual survey carried out by the Dutch Research Center for Education and Labor Market (ROA). This monitor samples applied science graduates and includes questions on their educational background and labor market outcomes. The sample consists of approximately 20,000 applied science graduates per year, which corresponds to a response rate of 40 percent. The sampling frame is the administrative databases of universities of applied science, which contain data on graduate date, type of program and field of study. 95 percent of the graduates in the Netherlands are enrolled at the institutes that take part in the survey.[3] Graduates are

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[3]A few, mostly private institutes, are not connected to the ROA monitor.

approached by mail and e-mail approximately 1.5 years after graduation. Graduates from the Arts sector are excluded in our analyses as they have a different questionnaire and thus, cannot be compared with the other sectors.

The applied science graduates are asked which level of education and which field of study is needed for their current position. Based on this, the type of mismatch (no mismatch vs. vertical vs. horizontal vs. double mismatch) is identified. Also, we introduce "being unemployed" as an additional labor market outcome.

In addition, we restrict the sample according to the following factors: Firstly, we look only at graduates with a Bachelor education (excluding graduates from Master studies) because the percentage with an applied science master is very low. Secondly, we focus on full-time students. Part-time students have quite different features than full-time students and often already had a job and usually remain in this job after graduation. Thirdly, we exclude students that are return migrants by looking only at those that live and work in the Netherlands at the time the survey is carried out. Lastly, to reduce linguistic and cultural differences to a minimum, we only look at people born in the Netherlands. Thus, we compare second generation immigrants to Dutch natives.

To examine mismatches we use a self-evaluation measure of the match between a graduate's job and education.[4] The different educational mismatch outcomes are determined by different questions in the applied science monitor survey where respondents were asked to indicate the education level required by the employer as well as whether their current job is in the same field as their education. Comparing the respondents' educational level required for the job to the respondents' actual educational level, a person is defined as vertically mismatched if the education is higher than the level required for their current job. When asked about the study field required for the job, respondents could use the following response categories: exclusively my own study field, my own or a related study field, a completely different study field, no specific study field. If a respondent indicated one of the former two, they are classified as correctly matched on the content and if they reported one of the latter two they are classified as being horizontally mismatched. If a respondent showed a vertical as well as horizontal mismatch, they are classified as experiencing a double mismatch.

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[4]Using a self-evaluated measure is also referred to as the subjective method. Educational mismatches have also been tested via expert classification (objective method) and, for overeducation, in average years of schooling (empirical method). See e.g. Piracha and Vadean (2013) or Visintin et al. (2015) for a discussion of the different methods.

Our dependent variable is a categorical variable that indicates whether a person experiences (1) no mismatch, (2) a horizontal mismatch, (3) a vertical mismatch, (4) a double mismatch (horizontal and vertical) or (5) is unemployed. A person is defined as unemployed if currently looking for a job and working less than 12 hours a week.[5]

Our main independent variable captures whether a person is a second generation immigrant or not, differentiating between Dutch natives, western, and non-western second generation immigrants. A second generation immigrant is defined as a person born in the Netherlands where at least one of the parents was born abroad. Following the definition of the Dutch Bureau of Statistics, non-western immigrants are from Africa, Latin-America, Asia (excluding Indonesia and Japan) and Turkey and western immigrants are, accordingly, from Europe (excluding Turkey), North America, Oceania, Indonesia or Japan.[6] As we restrict our analysis to second generation immigrants born in the Netherlands and to shorten the terms describing them, in the remainder of the chapter we refer to western second generation immigrants as western immigrants and non-western second generation immigrants as non-western immigrants.

In the analysis in the next section, we control for several variables which we expect, based on the literature review in section 2.1, to possibly have an effect. Firstly, we control for individual characteristics, i.e. age and gender. Age of the respondent is measured at the moment the survey was conducted. As previous research has shown contradictory evidence concerning the effect of age on the probability of a mismatch, we allow for a non-linear relationship between age and mismatch by additionally including age-squared. By controlling for gender, we control for the different employment profiles of men and women. Secondly, we control for school performance and resume building. We control for the average final grade the respondent received for an applied science study as well as the highest prior education of the respondent.[7] By including a set of variables on other experiences during the education, we attempt to control for informal skills students might acquire on the job, which can influence an educational mismatch as discussed in section 4.2. The variables concern experience within boards and committees, internships in the Netherlands and abroad, education abroad, and other relevant experience. Thirdly, we control for the

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[5]This definition follows the definition of unemployment by the Dutch Bureau of Statistics (CBS).

[6]https://www.cbs.nl/nl-nl/onze-diensten/methoden/begrippen

[7]Prior education is controlled for with a categorical variable where the respondents could indicate their highest prior education, i.e. general secondary education, pre-university secondary education, school-based/work-based secondary vocational education, higher vocational education or other.

study fields where each study program is assigned to one of 27 categories.[8]

The final sample consists of 77,781 observations from the years 2006 to 2014 of which 8.5 percent are immigrants (4.5 percent western and 4 percent non-western immigrants).

Table 4.1 displays the incidences of mismatches and unemployment of the whole data set for Dutch natives, western immigrants, and non-western immigrants separately.[9] Among all groups, the majority is correctly matched. However, the share of correctly matched respondents is the highest for Dutch natives and the lowest for non-western immigrants with a difference of 11.6 percentage points. When looking at double mismatches as well as unemployment, a smaller share of Dutch natives is experiencing one of the two. Among the immigrant groups, non-western immigrants show higher occurrences for both outcomes. The effect is particularly strong for unemployment. Among non-western immigrants in the sample, 11.7 percent are unemployed, compared to 6.52 percent of western immigrants and 4.7 percent of Dutch natives. Western immigrants show the highest occurrence of only horizontal mismatches and Dutch natives the lowest. When looking at vertical mismatches only, it is Dutch natives who show the highest occurrence and non-western immigrants the lowest.

To capture the effect of immigrant status on educational mismatches and unemployment, a multinomial logistic regression is estimated with five possible labor market outcomes (no mismatch, horizontal mismatch, vertical mismatch, double mismatch and unemployment):

$$Pr(LabourMarketOutcome_i) = MigStatus_i + X_i + \varepsilon_i$$

where i is the individual, $MigStatus_i$ is the immigrant status of the individual (Dutch native, western immigrant, non-western immigrant) and X_i captures the control variables mentioned above.

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[8]Those 27 categories are: educational studies, educational studies in general subjects, teacher occupational subjects, pedagogic, art, social and cultural education, communicational studies, journalism, business administration, marketing and commercial economics, accountancy and finance, business economics and human resource management, law, environment studies, computer science, mechanical engineering, electrical engineering, chemistry, civil engineering, agriculture, nursery and medical diagnostics, physiotherapy, social work, leisure and facility management, logistics, remaining, university: education.

[9]Summary statistics of the control variables can be found in the Appendix.

Table 4.1: Incidence of mismatches

Mismatch	Total		Dutch		Western immigrants		Non-western immigrants	
	Obs.	%	Obs.	%	Obs.	%	Obs.	%
No mismatch	52243	63.79	48420	64.55	1899	58.16	1924	52.97
Horizontal mismatch	9066	11.07	8070	10.76	490	15.01	506	13.93
Vertical mismatch	9486	11.58	8794	11.72	337	10.32	355	9.77
Double mismatch	6943	8.48	6196	8.26	326	9.98	421	11.59
Unemployed	4166	5.09	3527	4.7	213	6.52	426	11.73

4.4   Results

In the following section, we present the results of the multinomial logistic regression to shed light on whether an ethnic penalty in educational mismatches and unemployment exists. As discussed in section 4.2, differences in the incidence of educational mismatches could be due to other factors but immigrant status. Accordingly, we account for different observable factors, namely age (and age^2), gender, average grade, highest education before this study, the field of study and variables capturing experience. We furthermore add regional and year dummies to account for regional and time differences.[10]

Table 4.2 presents the results of the multinomial logit regressions reported in average marginal effects. We find that being an immigrant, western or non-western, decreases the likelihood of being correctly matched compared to Dutch natives. The coefficient for non-western immigrants is bigger than for western immigrants. However, the difference between the two coefficients is statistically insignificant.[11]

The immigrant status also matters when it comes to single mismatches, i.e. either horizontal or vertical mismatches. Compared to Dutch natives, western immigrants are more likely to experience a horizontal mismatch, whereas no difference exists between Dutch natives and non-western immigrants. Concerning vertical mismatches, non-western immigrants are less likely to experience a vertical mismatch than Dutch natives, whereas there is no difference between western immigrants and Dutch natives.

Being a non-western immigrant increases the probability of experiencing a mismatch in level as well as content, i.e. a double mismatch. Being a western immigrant does not change this likelihood compared to Dutch natives.

The results in column (2) to (4) suggest that being a second-generation western immigrant increases the likelihood of a horizontal mismatch. Second-generation western immigrants seem to not be more likely overeducated than Dutch natives. Furthermore, the results in column (2) to (4) suggest

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[10]In this chapter, we report results where we control for regional effects on provincial level. The results are robust to changing this to a less detailed (North, East, South, West) or more detailed (RPA-clusters) regional level and the corresponding tables can be found in the Appendix in table 4.4 and 4.5.

[11]See the marginsplot in the Appendix

Table 4.2: Results

	(1)	(2)	(3)	(4)	(5)
	No	Horizontal	Vertical	Double	Unemployed
Western immigrant	-0.0281***	0.0179***	-0.0079	0.0057	0.0123***
	(0.0082)	(0.0056)	(0.0056)	(0.0049)	(0.0042)
Non-western immigrant	-0.0527***	0.0075	-0.0282***	0.0160***	0.0574***
	(0.0079)	(0.0051)	(0.0047)	(0.0048)	(0.0051)
Reference group: Dutch natives					
Age	-0.0133***	0.0064***	-0.0045***	0.0060***	0.0054***
	(0.0010)	(0.0006)	(0.0007)	(0.0006)	(0.0004)
Female	-0.0326***	-0.0105***	0.0283***	0.0140***	0.0008
	(0.0041)	(0.0026)	(0.0028)	(0.0024)	(0.0020)
Reference group: Male					
GPA	0.0285***	-0.0013	-0.0101***	-0.0125***	-0.0047***
	(0.0014)	(0.0010)	(0.0010)	(0.0009)	(0.0007)
Highest education:					
Pre-university secondary education	0.0245***	0.0024	-0.0086***	-0.0120***	-0.0064***
	(0.0048)	(0.0033)	(0.0031)	(0.0030)	(0.0024)
School-based/Work-based	0.0262***	-0.0228***	0.0363***	-0.0277***	-0.0120***
secondary vocational education	(0.0042)	(0.0027)	(0.0031)	(0.0024)	(0.0019)
Higher vocational education	0.0598***	-0.0143**	-0.0120**	-0.0247***	-0.0088**
	(0.0089)	(0.0060)	(0.0061)	(0.0051)	(0.0041)
Other	0.0388**	0.0004	-0.0032	-0.0296***	-0.0064
	(0.0162)	(0.0114)	(0.0109)	(0.0083)	(0.0068)
Reference group: General secondary education					
Experience during study:	0.0344***	-0.0072***	0.0093***	-0.0260***	-0.0105***
Other (yes)	(0.0033)	(0.0022)	(0.0022)	(0.0020)	(0.0016)
Experience during study:	0.0205***	0.0142***	-0.0217***	-0.0051*	-0.0079***
Student/board committee (yes)	(0.0043)	(0.0029)	(0.0029)	(0.0026)	(0.0020)
Experience during study:	-0.0104	0.0181***	-0.0197***	-0.0026	0.0145***
Education abroad (yes)	(0.0066)	(0.0042)	(0.0045)	(0.0036)	(0.0034)
Experience during study:	0.0004	0.0061*	-0.0031	-0.0067**	0.0033
Internship abroad (yes)	(0.0049)	(0.0034)	(0.0032)	(0.0029)	(0.0024)
Experience during study:	0.0345***	0.0019	-0.0260***	-0.0077	-0.0028
Internship in the Netherlands (yes)	(0.0084)	(0.0048)	(0.0065)	(0.0048)	(0.0037)
Year dummies	yes	yes	yes	yes	yes
Sector dummies	yes	yes	yes	yes	yes
Regional dummies	yes	yes	yes	yes	yes
Observations	77,781	77,781	77,781	77,781	77,781

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

that being a second generation non-western immigrant increases the likelihood of experiencing a double mismatch, i.e. a mismatch in level and content. As non-western immigrants are more likely to be double mismatched, the decreased likelihood of experiencing a single vertical mismatch (column 3) is difficult to interpret as it can be due to non-western immigrants mainly experiencing a vertical and a horizontal mismatch at the same time.

Being an immigrant furthermore increases the likelihood of being unemployed, independent of being a western or non-western immigrant. The coefficient is higher for non-western than western immigrants and the difference between the coefficients is significant. Thus, being a second-generation immigrant increases the likelihood of being unemployed, even more so for non-western than western immigrants.

Concerning the control variables, age significantly affects all labor market outcomes and the older the respondent, the worse for his or her labor market outcomes. If age increases, graduates are less likely to be correctly matched and more likely to be horizontally or double mismatched as well as unemployed. Only the likelihood of a single vertical mismatch decreases with age.

Gender affects the likelihood of a mismatch but not the likelihood of being unemployed. Compared to their male counterparts, female applied science graduates are less likely to be correctly matched. Furthermore, they are more likely to experience a double mismatch or a single vertical mismatch. However, being female decreases the likelihood of a single horizontal mismatch.

In line with the previous literature discussed in section 4.2, a higher average grade positively affects a respondent's labor market outcomes. A better grade increases the likelihood of being correctly matched and decreases the likelihood of a single vertical mismatch, double mismatch or unemployment. The average grade does not affect the likelihood of a single horizontal mismatch.

The general secondary education is the lowest of the categories for education acquired before the applied science studies of the graduates in our data set. Compared to general secondary education, graduates with pre-university secondary education, school-based/work-based secondary vocational education, and higher vocational education are more likely to be correctly matched and less likely to be double mismatched or unemployed. Students with higher vocational education are also more likely to experience both types of single mismatches compared to graduates with general secondary education. Graduates with pre-university secondary education are also less likely than students with general secondary education to ex-

perience a vertical mismatch. However, they are more likely to be single horizontally mismatched. The opposite is the case for the likelihood of single mismatches for school-based/work-based secondary vocational education graduates compared to those with general secondary education as they are less likely to be single horizontally mismatched but more likely to be single vertically mismatched.

Most of the variables capturing additional experiences during the studies have a positive effect on labor market outcomes, in line with previous research discussed in section 4.2. However, the effect seems to be stronger for experience acquired within the Netherlands than abroad. Being a member of a student committee, doing an internship in the Netherlands and other experiences increase the likelihood of being correctly matched. Acquiring some education abroad or doing an internship in another country, however, does not affect the likelihood of a correct match. Experience in a student committee and other experience also decrease the likelihood of being double mismatched or unemployed, whereas an internship in the Netherlands does not affect it. If anything, acquiring some of the education abroad seems to have a negative effect on labor market outcomes as it increases the likelihood of single mismatch as well as unemployment and only decreases the likelihood of a single vertical mismatch. Having done an internship abroad only shows weak effects. At a ten percent significance level, it increases the likelihood of a single horizontal mismatch and at a five percent significance level it decreases the likelihood of a double mismatch. As mentioned above, doing an internship in the Netherlands increases the likelihood of being correctly matched. Furthermore, it negatively affects the likelihood of a single vertical mismatch, while there is no effect on the other labor market outcomes.

4.5   Conclusion and discussion

In this chapter, we analyze whether being an immigrant increases the likelihood of experiencing an educational mismatch or unemployment. We use cross-sectional data on recent applied science graduates in the Netherlands from 2006 to 2014. By comparing second generation immigrants with Dutch natives who finished the same educational level in the same country, we eliminate that differences occur due to differences in the quality of the education or in language capabilities.

Our results show that an ethnic penalty in educational mismatches and unemployment exists, being more severe for non-western than western immigrants. This ethnic penalty is, in particular, visible in the decreased

likelihood of a correct educational match for immigrants in general, the increased likelihood of non-western immigrants to experience a double educational mismatch and the increased likelihood of unemployment for both types of immigrants with the effect of the latter being even stronger for non-western immigrants. Furthermore, we find that other factors such as differences in study choices, pre-higher educational paths, GPA or differences in resume building during the study only marginally explain ethnic penalties. Previous empirical studies suggest that immigrants show worse labor market outcomes and are more likely to be mismatched. However, many of these studies have been criticized for studying a heterogeneous group where differences in the incidence of mismatches may be due to differences in the quality of education or language capability. Our results suggest that the ethnic penalty found in previous studies remains when comparing immigrants who grew up in the same country and graduated in the same educational system.

Previous research has shown that educational mismatches reduce the returns to education, i.e. earning and job satisfaction. It is, therefore, important that policy makers try to reduce the ethnic penalty in educational mismatches and unemployment.

This chapter suggests that an ethnic penalty in labor market outcomes remains when studying a rather homogenous group and controlling for other determinants of educational mismatches and unemployment. Still, it should be noted that we cannot ultimately say what causes the ethnic penalty.

The observed ethnic penalty can be either due to discrimination or unobservable differences in ability. By controlling for various individual characteristics, we aim to control for many differences in ability. After controlling for these characteristics, we still find a clear impact of being an immigrant on the probability of experiencing a mismatch. Unfortunately, this chapter cannot fully identity what part of the effect is due to discrimination. However, recent experimental studies show that within the hiring process ethnical discrimination is present (Bertrand and Mullainathan, 2004; Drydakis and Vlassis, 2010; Carlsson and Rooth, 2007; Oreopoulosa, 2011; Kaas and Manger, 2012; Blommaert et al., 2014). These findings suggest that part of the ethnic penalty found in this chapter is caused by discrimination.

Next to ability, discrimination and the individual characteristics we control for, other personal traits such as an individual's attitude during a job interview might influence the likelihood of being mismatched or unemployed as well. Unfortunately, this study cannot, due do data limitations, take personal traits into account.

The different categories of a mismatch may vary in themselves. I.e., a

person can be horizontally mismatched in a completely different study field or no specific study field. While it goes beyond the scope of this chapter, future research might explore the distribution for immigrants and natives within the labor market outcome categories in this chapter.

4.6 Appendix

Table 4.3: Summary statistics, all variables

		Total		Dutch		Western immigrants		Non-western immigrants	
		Obs.	%	Obs.	%	Obs.	%	Obs.	%
Age (average)		81734	24.89	74849	24.84	3261	25.55	3624	25.37
Grade (average)		79762	3.65	73005	3.66	3180	3.6	3577	3.44
Mismatch	No mismatch	52243	63.79	48420	64.55	1899	58.16	1924	52.97
	Horizontal mismatch	9066	11.07	8070	10.76	490	15.01	506	13.93
	Vertical mismatch	9486	11.58	8794	11.72	337	10.32	355	9.77
	Double mismatch	6943	8.48	6196	8.26	326	9.98	421	11.59
	Unemployed	4166	5.09	3527	4.7	213	6.52	426	11.73
Gender	Male	34243	41.87	31506	42.07	1362	41.74	1375	37.87
	Female	47541	58.13	43384	57.93	1901	58.26	2256	62.13
Highest educational level before	General secondary education	42447	51.87	38861	51.85	1741	53.34	1845	50.85
	Pre-university secondary education	12670	15.48	11851	15.81	541	16.57	278	7.66
	School-Based/Work-Based secondary vocational education	22480	27.47	20305	27.09	808	24.75	1367	37.68
	Higher vocational education	3394	4.15	3165	4.22	141	4.32	88	2.43
	Other	847	1.03	764	1.02	33	1.01	50	1.38
Sector of studies	Educational studies	8211	10.03	7800	10.4	229	7.01	182	5.01
	Educational studies in general subjects	1533	1.87	1397	1.86	62	1.9	74	2.04

Teacher occupational subjects	1516	1.85	1437	1.92	43	1.32	36	0.99
Pedagogic	1649	2.01	1472	1.96	66	2.02	111	3.06
Art	602	0.74	535	0.71	37	1.13	30	0.93
Social and cultural education	357	0.44	318	0.42	20	0.61	19	0.52
Communicational studies	2693	3.29	2364	3.15	158	4.84	171	4.71
Journalism	880	1.07	813	1,08	36	1.1	31	0.85
Business administration	4210	5.14	3836	5.11	132	4.04	242	6.66
Marketing and commercial economics	5965	7.28	5264	7.02	297	9.1	403	11.1
Accountancy and finance	1594	1.95	1436	1.91	29	0.89	129	3.55
Business economics and human Resource management	5829	7.12	5046	6.73	300	9.19	483	13.3
Law	1335	1.63	1170	1.56	40	1.23	125	3.44
Environmental sciences	690	0.84	648	0.86	25	0.77	17	0.47
Computer science	4669	5.7	4189	5.58	226	6.92	254	6.99
Mechanical engineering	2564	3.13	2419	3.23	82	2.51	63	1.73
Electrical engineering	1334	1.63	1250	1.67	45	1.38	39	1.07
Chemistry	749	0.91	702	0.94	16	0.49	31	0.85
Civil engineering	3558	4.34	3351	4.47	138	4.23	69	1.9
Agriculture	1754	2.14	1702	2.27	39	1.19	13	0.36
Nursery and medical diagnostics	6381	7.79	5984	7.98	203	6.22	194	5.34
Physiotherapy	5999	7.32	5685	7.58	222	6.8	92	2.53
Social work	8523	10.41	7662	10.22	342	10.47	519	14.29
Leisure and facility management	7979	9.74	7261	9.68	436	13.35	282	7.76
Logistics	1144	1.4	1097	1.46	33	1.01	14	0.39
Remaining	75	0.09	66	0.09	6	0.18	3	0.08
University: education	111	0.14	102	0.14	3	0.09	6	0.17

Exp. during study:	Yes	40975	50.08	37629	50.22	1628	49.97	1718	47.34
Other	No	40847	49.92	37306	49.78	1630	50.03	1911	52.66
Exp.during study:	Yes	14646	17.9	13539	18.07	540	16.57	567	15.62
Student/board committee	No	67176	82.1	61396	81.93	2718	83.43	3062	84.38
Exp. during study:	Yes	5486	6.7	4808	6.42	333	10.22	345	9.51
Education abroad	No	76337	93.3	70128	93.8	2925	89.78	3284	90.49
Exp. during study:	Yes	13334	16.3	12104	16.15	654	20.07	576	15.88
Internship abroad	No	68492	83.7	62836	83.85	2604	79.93	3052	84.12
Exp. during study:	Yes	77959	95.31	71538	95,5	3021	92.7	3400	93.72
Internship in the NL	No	3833	4.69	3367	4.5	238	7.3	228	6.28

Figure 4.1: Plot of average marginal effects
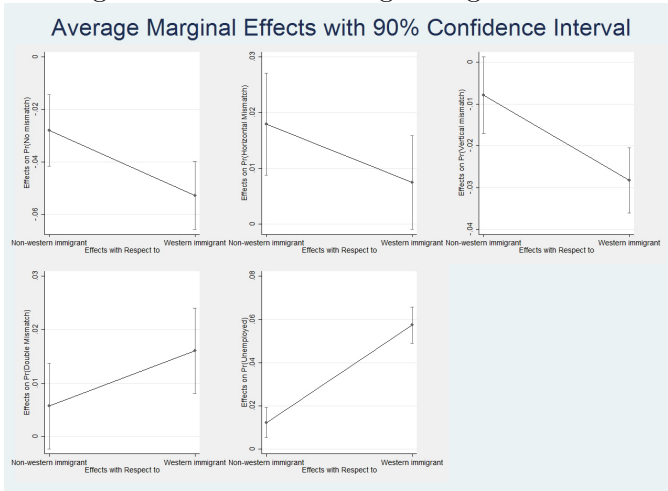
Table 4.4: Robustness check: Results with broad regional cotrols

	(1) No	(2) Horizontal	(3) Vertical	(4) Double	(5) Unemployed
Western immigrant	-0.0279***	0.0178***	-0.0081	0.0061	0.0121***
	(0.0083)	(0.0056)	(0.0056)	(0.0049)	(0.0041)
Non-western immigrant	-0.0513***	0.0081	-0.0288***	0.0159***	0.0562***
	(0.0078)	(0.0051)	(0.0047)	(0.0048)	(0.0050)
Reference group: Dutch natives					
Age	-0.0133***	0.0066***	-0.0046***	0.0060***	0.0053***
	(0.0010)	(0.0006)	(0.0007)	(0.0006)	(0.0004)
Female	-0.0325***	-0.0102***	0.0284***	0.0138***	0.0006
	(0.0041)	(0.0026)	(0.0028)	(0.0024)	(0.0020)
Reference group: Male					
GPA	0.0284***	-0.0013	-0.0101***	-0.0124***	-0.0047***
	(0.0014)	(0.0010)	(0.0010)	(0.0009)	(0.0007)
Highest education:					
Pre-university secondary education	0.0247***	0.0025	-0.0087***	-0.0121***	-0.0064***
	(0.0048)	(0.0033)	(0.0031)	(0.0030)	(0.0024)
School-based/Work-based	0.0259***	-0.0231***	0.0368***	-0.0276***	-0.0120***
secondary vocational education	(0.0042)	(0.0027)	(0.0031)	(0.0024)	(0.0019)
Higher vocational education	0.0593***	-0.0138**	-0.0120**	-0.0248***	-0.0088**
	(0.0089)	(0.0060)	(0.0061)	(0.0051)	(0.0041)
Other	0.0392**	0.0001	-0.0030	-0.0296***	-0.0066
	(0.0161)	(0.0114)	(0.0109)	(0.0083)	(0.0067)
Reference group: General secondary education					
Experience during study:	0.0344***	-0.0070***	0.0093***	-0.0261***	-0.0106***
Other (yes)	(0.0033)	(0.0022)	(0.0022)	(0.0020)	(0.0016)
Experience during study:	0.0204***	0.0144***	-0.0218***	-0.0051*	-0.0079***
Student/board committee (yes)	(0.0043)	(0.0029)	(0.0029)	(0.0026)	(0.0020)
Experience during study:	-0.0105	0.0183***	-0.0198***	-0.0024	0.0144***
Education abroad (yes)	(0.0066)	(0.0042)	(0.0045)	(0.0036)	(0.0034)
Experience during study:	0.0002	0.0060*	-0.0030	-0.0065**	0.0034
Internship abroad (yes)	(0.0049)	(0.0034)	(0.0032)	(0.0029)	(0.0024)
Experience during study:	0.0342***	0.0020	-0.0260***	-0.0074	-0.0027
Internship in the Netherlands (yes)	(0.0084)	(0.0048)	(0.0065)	(0.0048)	(0.0037)
Year dummies	yes	yes	yes	yes	yes
Sector dummies	yes	yes	yes	yes	yes
Regional dummies	yes	yes	yes	yes	yes
Observations	77,781	77,781	77,781	77,781	77,781

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Region-specific effects are captures by a variables differentiating between nort, east, west and south.

Table 4.5: Robustness check: Results with detailed regional controls

	(1)	(2)	(3)	(4)	(5)
	No	Horizontal	Vertical	Double	Unemployed
Western immigrant	-0.0282***	0.0171***	-0.0072	0.0061	0.0121***
	(0.0083)	(0.0055)	(0.0056)	(0.0049)	(0.0042)
Non-western immigrant	-0.0536***	0.0062	-0.0274***	0.0172***	0.0575***
	(0.0079)	(0.0051)	(0.0048)	(0.0049)	(0.0051)
Reference group: Dutch natives					
Age	-0.0134***	0.0063***	-0.0043***	0.0061***	0.0053***
	(0.0010)	(0.0006)	(0.0007)	(0.0006)	(0.0004)
Female	-0.0323***	-0.0108***	0.0283***	0.0141***	0.0007
	(0.0041)	(0.0026)	(0.0028)	(0.0024)	(0.0020)
Reference group: Male					
GPA	0.0286***	-0.0012	-0.0101***	-0.0125***	-0.0048***
	(0.0014)	(0.0010)	(0.0010)	(0.0009)	(0.0007)
Highest education:					
Pre-university secondary education	0.0246***	0.0023	-0.0084***	-0.0119***	-0.0065***
	(0.0048)	(0.0033)	(0.0031)	(0.0030)	(0.0024)
School-based/Work-based	0.0267***	-0.0226***	0.0358***	-0.0279***	-0.0119***
secondary vocational education	(0.0042)	(0.0027)	(0.0031)	(0.0024)	(0.0019)
Higher vocational education	0.0603***	-0.0142**	-0.0125**	-0.0248***	-0.0087**
	(0.0089)	(0.0060)	(0.0060)	(0.0051)	(0.0041)
Other	0.0391**	0.0003	-0.0036	-0.0297***	-0.0062
	(0.0162)	(0.0114)	(0.0109)	(0.0083)	(0.0068)
Reference group: General secondary education					
Experience during study:	0.0344***	-0.0074***	0.0094***	-0.0259***	-0.0105***
Other (yes)	(0.0033)	(0.0022)	(0.0022)	(0.0020)	(0.0016)
Experience during study:	0.0206***	0.0139***	-0.0215***	-0.0050*	-0.0080***
Student/board committee (yes)	(0.0043)	(0.0029)	(0.0029)	(0.0026)	(0.0020)
Experience during study:	-0.0105	0.0177***	-0.0191***	-0.0026	0.0145***
Education abroad (yes)	(0.0066)	(0.0042)	(0.0046)	(0.0036)	(0.0034)
Experience during study:	-0.0002	0.0059*	-0.0026	-0.0064**	0.0033
Internship abroad (yes)	(0.0049)	(0.0034)	(0.0032)	(0.0029)	(0.0024)
Experience during study:	0.0343***	0.0021	-0.0261***	-0.0077	-0.0027
Internship in the Netherlands (yes)	(0.0084)	(0.0048)	(0.0065)	(0.0048)	(0.0037)
Year dummies	yes	yes	yes	yes	yes
Sector dummies	yes	yes	yes	yes	yes
Regional dummies	yes	yes	yes	yes	yes
Observations	77,781	77,781	77,781	77,781	77,781

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

We control for age, gender, average grade, prior education, sectors of study, other experience,

region-specific effects captured by RPA clusters, year-specific effects

Chapter 5

Summary and conclusions

This dissertation contributes to economic research on recent immigration by addressing who immigrates analyzing the self-selection of immigrants concerning welfare generosity differences (chapter 2), why people are mobile and the role family ties play in these mobility intentions (chapter 3), and how immigrant outcomes differ to those of natives by studying ethnic penalties in educational mismatches for second generation immigrants (chapter 4).

Immigration is a very complex topic that goes beyond the scope of mainstream economics (Bodvarsson and Van den Berg, 2013). All chapters of this dissertation aim at including insights of other disciplines. As Bodvarsson and Van den Berg (2013) point out, next to the economic perspective, immigration needs to be studied including their sociological, psychological, demographic and political dimension. Even though the theoretical formalization of chapter 2 and chapter 3 treat immigrants as workers, the costs associated with immigration in these theories go beyond income aspects by including network effects or the effect of family ties. The following section of this conclusion provides a summary of the chapters. Afterwards, limitations and lines of future research are discussed.

5.1 Chapter summaries

5.1.1 Chapter 2: Welfare generosity and educational selectivity of immigrants

Whether people immigrate because of welfare generosity and how this affects immigrant's skill composition has been subject of heated, highly po-

litical debates in the last years. Most of the research evolved around the welfare magnet hypothesis according to which low-skilled immigrants self-select into countries with high welfare generosity and high-skilled immigrants self-select into countries with low welfare generosity. However, as data on immigrants by educational level is limited, most empirical studies tested this hypothesis using absolute immigration instead of the skill composition of immigrants.

In this chapter, I aimed to deepen the insight into the relationship between welfare generosity and immigration by analyzing whether and to what extent welfare generosity affects the educational selectivity of out-migration. Educational selectivity of out-migration is the skill composition of the migrant population relative to the skill composition in the origin country. Specifically, it captures skilled migrants over low-skilled migrants relative to the skilled origin population over the low-skilled origin population. Analyzing the skill composition of the migrant population relative to the population in the country of origin ensures that the observed educational selectivity is not just a reflection of the skill composition of the country of origin.

The determinants of the educational selectivity of out-migration are analyzed from a theoretical and an empirical angle. In the theoretical part, a selection equation is formulated. This equation shows that welfare generosity differences between the country of destination and the country of origin negatively affect the educational selectivity of out-migration. Thus, if the difference between welfare generosity in the country of destination and the country of origin is big, the migrant population is relatively less skilled than the origin population. Next to that, the educational selectivity of out-migration depends on the difference in the expected wage premium of the country. The wage premium is the difference between the wage for skilled and the wage for low-skilled. Lastly, the educational selectivity of out-migration depends on a set of skill-specific immigration costs, such as language differences and networks.

Due to newly available data on immigrant stocks, I was furthermore able to test the determinants of the educational selectivity of out-migration empirically. Using a merged data set on immigration between 15 OECD countries between the years 1985 to 2005, a negative but weak effect is found when looking at the skilled selection ratio, i.e. high- and middle- over low-skilled. However, no effect was found when looking at the high-skilled selectio ratio (excluding middle-skilled) only. These findings suggest that other determinants, such as immigrant networks, may be of relatively higher importance for the selectivity of out-migration.

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As an additional step, total welfare generosity was divided into three sub-indices, i.e. pension generosity, unemployment generosity, and sick pay generosity to investigate possible differences in the effect of the three on the educational selectivity of out-migration. The findings of this chapter suggest that unemployment generosity and sick pay generosity have no effect on the educational selectivity of out-migration, while pension generosity has a negative, highly significant effect. Further research is needed to identify the causes of the differing effects of public pensions, unemployment insurance and sick pay generosity. However, a possible explanation lies in the strong income redistributive effect of pensions compared to unemployment benefits and sickness pay.

5.1.2 Chapter 3: Should I stay, commute or migrate? The effect of family ties on cross-border mobility intentions

Even though the Citizens Rights Directive 2004/38/EC grants citizens of the EU the right to move and reside freely, and even though increased mobility within the EU is needed to foster economic growth, Intra-European mobility remains at low levels. The observed immobility can be due to the big monetary and non-monetary costs of cross-border mobility. The costs of cross-border mobility are particularly high for attached individuals, namely people with a partner or children. In order to foster labor mobility within Europe, the role of family ties in mobility decisions needs to be better understood.

In this chapter, the role of family ties as determinants of mobility intentions was analyzed. A model of two-person household mobility, i.e. family mobility, was presented and used to show under which conditions the household decides to stay, migrate, or cross-border commute.

In an empirical analysis on mobility intentions in the border regions of Austria and Slovakia, I analyzed the effect of family ties on individual mobility intentions. These regions, namely Vienna, Bratislava, and Trnava, are particularly suitable for the analysis as they are geographically close regions with high population density. The findings of this chapter suggest that some family ties matter. Having a partner as well as the presence of children decrease mobility intentions. However, the results of the presence of children are less robust than those of having a partner. The partner's characteristics, such as their educational level or experience and attitudes towards mobility, show only little effect. When looking at the total sample, respondents who are in a relationship have fewer mobility intentions as they are more likely to stay and less likely to cross-border commute or migrate.

Children mainly affect the likelihood to migrate. When considering different age groups below 18, those younger than 13 affect mobility intentions stronger than those between 13 and 18.

In an additional step, I analyzed mobility intentions of respondents in two-partner households, in order to include more detailed partner characteristics. While based on the model of family mobility, an effect of the partner's education on the mobility intentions is expected, the empirical analysis provided no evidence for that. Among the variables that capture the partner's attitude and experience of working abroad, the partner's plan to work abroad clearly increases mobility intentions. The partner's plan to work abroad decreases the likelihood of intending to stay and increases the likelihood of intending to cross-border commute or migrate.

Lastly, I looked at gender differences as previous research suggests that women are less mobile than men. This difference might be caused by differences in family responsibility between genders, which would be visible with family ties stronger affecting mobility intentions of women than men. The results in this chapter suggest that the presence of children indeed affects mobility intentions of women more than men. Women are more likely to stay and less likely to commute than men if they have children. However, men and women do not seem to consider having a partner differently in their mobility intentions.

This chapter highlighted the role of family ties on cross-border mobility intentions and illustrates that the mobility decision is a joint decision where a partner can 'veto' by staying. Furthermore, children decrease the likelihood of cross-border migration. To increase Intra-EU labor mobility, policy makers could, therefore, decrease the costs of relocating with children by investing in international schools and EU-wide regulations on the transferability of education. Furthermore, cross-border commuting may be a good channel via which cross-border mobility of families can be increased as it allows one partner to continue to work and live in the country of origin. To reduce cross-border commuting costs, barriers in social security portability need to be reduced.

5.1.3 Chapter 4: Educational mismatches for second generation immigrants. An analysis of applied science graduates in the Netherlands

Immigrants have been found to show worse labor market outcomes compared to natives. If this difference persists after controlling for other explanatory variables such as experience, grades or language differences, it is

called an ethnic penalty. Ethnic penalties can be either caused by discrimination or unobservable differences in ability. While differences between immigrants and natives in some labor market outcomes such as wages have been analyzed widely, educational mismatches have not received much attention. Educational mismatches describe the difference between the education attained and the education required for a job and can be divided into vertical and horizontal mismatches. While vertical mismatches are mismatches in level, i.e. the level of education is higher than required for the job, horizontal mismatches are mismatches in content, i.e. the field of educational does not match the job.

This chapter shed light on whether western and non-western second generation immigrants are more prone to educational mismatches and unemployment than their native counterparts. It is important to analyze ethnic penalties in labor market outcomes as people who experience educational mismatches have been found to be less satisfied with their job and earn less than those that are correctly matched.

When comparing labor market outcomes of immigrants and natives, it is important to look at a relatively homogenous group in order to avoid that differences between immigrants and natives are caused by differences in their education or language difficulties. In this chapter, a cross-sectional data set among recent applied science graduates in the Netherlands was used, and we focused on the comparison of natives with second generation immigrants. Thus, we compared people who were born in the same country, grew up in the same educational system and graduated with the same educational degree between 2006 and 2014.

The findings of this chapter show that immigrants are more likely to experience educational mismatches and unemployment. Thus, an ethnic penalty in educational mismatches exists. Particularly, immigrants are less likely to have a correct match between their education and job. Furthermore, non-western immigrants are more likely to experience a vertical and a horizontal mismatch at the same time. Both types of immigrants, western and non-western, are more likely to be unemployed. This likelihood is significantly higher for non-western than western immigrants. After controlling for other variables that have been found to influence the incidence of educational mismatches, such as study programs, GPA or differences in resume building, an ethnic penalty persists.

While this chapter suggested that an ethnic penalty in labor market outcomes remains when analyzing a rather homogenous group and controlling for other determinants, it cannot be ultimately said what causes the ethnic penalty. It may either be due to discrimination or explained by differ-

ences in unobservable ability. However, by controlling for various individual characteristics, many differences in ability are controlled for. Furthermore, recent experimental studies indicate that ethnic discrimination is present within the hiring process and, thus, likely to explain at least parts of the ethnic penalty found in this chapter.

5.2   Limitations and future research

It should be noted that the theoretical formulations of this dissertation treat immigration as a permanent decision. And indeed, many immigration decisions are permanent moves (Bodvarsson and Van den Berg, 2013). However, the increasing number of international student immigration (Balá and Williams, 2004) as well as return migration from guest workers throughout Europe (Constant and Massey, 2002) illustrate that immigration may also be a temporary decision. Dumont and Spielvogel (2008) identify four main reasons for return migration, which are (1) failure to integrate in the country of destination or a change in the country's economic situation, (2) individual preferences for their country of origin, (3) achievement of a saving goal or (4) improved economic prospects in the country or origin due to the experience gained in the country of destination. Future research could expand on the findings of this dissertation by considering them under a more dynamic immigration decision and given the reasons for return migration above. Concerning chapter 2, welfare generosity might not be of high importance in initial immigration decisions but instead influence the decision of immigrants to stay in the country of destination. Furthermore, it could be analyzed how the ethnic penalties in labor market outcomes in general, and the ethnic penalty in educational mismatches found in chapter 4 in particular, influence return migration of second generation immigrants.

Limitations of many empirical studies on immigration come from the data available. In chapter 2 of this dissertation, the stock of immigrants was analyzed. An alternative way of capturing immigration is looking at immigration flows. The immigration flow refers to the process of moving from one place to another, while the immigrant stock is the number of people living in a different place than where they were born. While immigration flows capture the flow of immigrants between two countries, immigrant stocks are also influenced by return migration, deaths and, depending on the citizenship rights in the country of origin, by naturalization or birth. However, as no cross-country data on immigrant flows by skill or educational level exist, this dissertation, as for instance Beine et al. (2011) and Grogger and Hanson (2011), uses migrant stocks as a proxy for immigrant

flows.[1]

Economist tend to, based on their research, have a more favorable view on immigration than the overall population in many countries (Bodvarsson and Van den Berg, 2013). A survey among social scientists in 1985 found that they were more supportive of immigration than the general public, with the group of economists being even the most positive (Moore, 1986). Although their views have become more nuanced lately, also today economists tend to have a more favorable view on immigration (Bodvarsson and Van den Berg, 2013). Chapter 2 of this dissertation provides an indication that welfare generosity does not play the dominant role in the immigration decision and selectivity of immigrants that some politicians attribute to it. In the future of economics of immigration, it is, therefore, the task and responsibility of social science researchers on the topic of immigration to communicate their findings more clearly and effectively to policy makers and the outside world.

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[1]Two cross-country data sets that cover stock of immigrants by educational level are Docquier and Marfouk (2006) and Brücker et al. (2013).

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Nederlandse Samenvatting

In 2015 bevonden meer dan 240 miljoen mensen zich buiten hun geboorteland. Dit is gelijk aan 3,3 procent van de wereldbevolking (United Nations, 2015). Het aandeel immigranten in Europa steeg van 6,8 procent in 1990 tot 10,3 procent van de bevolking in 2015. Een vergelijkbare trend is zichtbaar in Noord-Amerika, waar het aandeel immigranten in dezelfde periode van 9,8 procent tot 15,2 procent steeg.

Deze trends onderstrepen het belang om inzicht te verkrijgen in de determinanten van immigratie en de sociale en economische integratie van immigranten.

Immigratie als thema in de economie gaat zover terug als Adam Smith, die in 1776 schreef "[. . .] a man is of all sorts of luggage the most difficult to be transported". Echter, internationale immigratie is pas sinds enkele decennia een belangrijk onderzoeksveld voor economen geworden.

In dit proefschrift analyseer ik de determinanten van immigratie. Meer specifiek kijk ik naar de rol van de omvang van de verzorgingsstaat in het land van herkomst en het land van bestemming voor educatieve selectie van immigranten (hoofdstuk 2), en de rol van familiebanden als determinanten van mobiliteitsintenties (hoofdstuk 3). Daarnaast bestudeer ik uitkomsten van immigranten door te kijken naar zogenaamde 'etnische boetes' (ethnic penalties) als arbeidsmarktuitkomsten van tweede generatie immigranten (hoofdstuk 4).

Hoofdstuk 2

In hoofdstuk 2 kijk ik naar de relatie tussen de omvang van de verzorgingsstaat en educatieve selectie van immigranten. Een centrale vraag in politieke debatten van de afgelopen jaren is of mensen zich in bepaalde landen vestigen vanwege verschillen in de omvang van verzorgingsstaten en hoe dit de samenstelling van vaardigheden van immigranten beïnvloedt. Het

merendeel van het onderzoek betreft de welvaartsmagneethypothese. Deze hypothese zegt dat laagopgeleiden landen met een ruime verzorgingsstaat verkiezen, terwijl hoogopgeleiden juist landen met een minder ruime verzorgingsstaat verkiezen. Omdat gegevens over het opleidingsniveau van immigranten beperkt zijn, gebruiken de meeste empirische studies data over absolute immigratie om de welvaartsmagneethypothese te toetsen. In dit hoofdstuk analyseer ik of en in welke mate verschillen in de omvang van de verzorgingsstaat educatieve selectie van immigranten beïnvloeden.

Educatieve selectie betreft de verhouding tussen het gemiddelde opleidingsniveau van immigranten en het gemiddelde opleidingsniveau van de bevolking in het land van herkomst. Het is belangrijk deze verhouding te analyseren om er zeker van te zijn dat de waargenomen educatieve selectie niet alleen een reflectie is van het gemiddelde opleidingsniveau in het land van herkomst.

De determinanten van educatieve selectie worden zowel theoretisch als empirisch onderzocht. In de theoretische literatuur wordt een selectievergelijking geformuleerd. Deze vergelijking toont aan dat verschillen in de omvang van de verzorgingsstaat in het land van bestemming en het land van herkomst een negatieve invloed op de educatieve selectiviteit hebben. Dat wil zeggen dat, als het verschil in omvang van verzorgingsstaten tussen beide landen groot is, de immigrantenbevolking relatief minder gekwalificeerd is dan de bevolking in het land van herkomst. Daarnaast wordt educatieve selectiviteit van immigranten door de verwachte loonpremie beïnvloed. De loonpremie is het verschil tussen het loon voor hoogopgeleiden en het loon voor laagopgeleiden. Tenslotte is educatieve selectiviteit van immigranten afhankelijk van een aantal (niet noodzakelijk monetaire) kosten die per opleidingsniveau verschillen, zoals taalbarrières of het opbouwen van een netwerk.

Om de determinanten van de educatieve selectiviteit van immigranten verder uit te diepen, maak ik gebruik van een dataset over immigratie in 15 OESO-landen tussen 1985 en 2005. De resultaten laten slechts een beperkt negatief effect zien van verschillen in de omvang van verzorgingsstaten. Dit suggereert dat andere determinanten, zoals immigrantennetwerken, van relatief groter belang zijn voor de educatieve selectiviteit van immigranten.

Tenslotte heb ik afzonderlijk gekeken naar drie onderdelen van een verzorgingsstaat: pensioenen, werkloosheidsverzekeringen en ziektewet-uitkering. Uit de resultaten blijkt de omvang van de werkloosheidsverzekering en ziektewet-uitkering geen effect op de educatieve selectiviteit van immigranten te hebben, terwijl de omvang van pensioenen een significant en negatief effect heeft. Verder onderzoek is nodig naar de oorzaken achter

de verschillende effecten van de drie facetten van de verzorgingsstaat. Een mogelijke verklaring is dat pensioenen een veel sterker herverdelend effect hebben dan werkloosheidsverzekeringen en ziektewet-uitkering.

Hoofdstuk 3

In hoofdstuk 3 van het proefschrift analyseer ik de effecten van familiebanden op grensoverschrijdende mobiliteitsintenties. Hoewel de Citizens Right Directive 2004/38/EC EU-burgers het recht op vrij verkeer en verblijf verleent, en hoewel toegenomen mobiliteit binnen de EU nodig is om economische groei te bevorderen, blijft de mate van intra-Europese mobiliteit laag. Deze immobiliteit kan te wijten zijn aan de hoge monetaire en niet-monetaire kosten van grensoverschrijdende mobiliteit. De kosten van grensoverschrijdende mobiliteit zijn bijzonder hoog voor mensen met sterke familiebanden met bijvoorbeeld een partner of kinderen. Om de arbeidsmobiliteit in Europa te bevorderden, moet de rol van familiebanden in mobiliteitsbeslissingen beter worden begrepen.

In dit hoofdstuk wordt de rol van familiebanden als determinant van mobiliteitsintenties geanalyseerd. Ik introduceer een model voor de mobiliteit van een tweepersoonshuishouden – familiemobiliteit –en gebruik dit om te laten zien onder welke voorwaarden een huishouden besluit om in het land van herkomst te blijven, te emigreren of grensoverschrijdend te pendelen. In een empirische analyse onderzoek ik het effect van familiebanden op individuele mobiliteitsintenties in de grensregio's van Oostenrijk en Slowakije. De gekozen regio's, Wenen, Bratislava en Trnava, zijn bijzonder geschikt voor de analyse omdat ze geografisch dicht bij elkaar liggen en een hoge bevolkingsdichtheid kennen.

De resultaten van dit hoofdstuk tonen aan dat sommige familiebanden een rol spelen. De aanwezigheid van een partner of kinderen vermindert mobiliteitsintenties. Echter, de effecten van de aanwezigheid van kinderen zijn minder robuust dan die van een partner. Kenmerken van de partner, zoals diens ervaring en houding ten opzichte van mobiliteit, hebben slechts een beperkt effect. Als we naar de totale steekproef kijken zijn respondenten die een relatie hebben minder mobiel. Het is aannemelijk dat ze in hun land van herkomst willen blijven en onwaarschijnlijk dat ze emigreren of grensoverschrijdend pendelen. De aanwezigheid van kinderen beïnvloedt voornamelijk emigratie. Voor de verschillende leeftijdsgroepen onder de 18 heeft de aanwezigheid van kinderen jonger dan 13 een sterker effect dan de aanwezigheid van kinderen tussen 13 en 18.

In dit hoofdstuk analyseer ik de mobiliteitsintenties van respondenten in tweepersoonshuishoudens ook door meer gedetailleerde partnerkenmerken mee te nemen. Hoewel het theoretische model van familiemobiliteit een effect van het opleidingsniveau van de partner op mobiliteitsintenties voorspelt, verschaft de empirische analyse hier geen bewijs voor. Zoals verwacht, vergroot een partner die van plan is in het buitenland te werken de mobiliteitsintenties.

Tot slot kijk ik naar verschillen tussen mannen en vrouwen. Eerder onderzoek heeft uitgewezen dat vrouwen minder mobiel zijn dan mannen. Dit verschil kan worden veroorzaakt door verschillen in verantwoordelijkheid binnen de familie. Dit zou zich dan uiten in een sterkere invloed van familiebanden voor mobiliteitsintenties voor vrouwen dan voor mannen. De resultaten in dit hoofdstuk laten zien dat de aanwezigheid van kinderen inderdaad de mobiliteitsintenties van vrouwen sterker beïnvloedt dan die van mannen. Vergeleken met mannen is het voor vrouwen met kinderen waarschijnlijker om in het land van herkomst te blijven en onwaarschijnlijker grensoverschrijdend te pendelen. Er is geen verschil in het effect van de aanwezigheid van een partner voor mobiliteitsintenties van mannen en vrouwen.

Dit hoofdstuk benadrukt de rol van familiebanden voor grensoverschrijdende mobiliteitsintenties en illustreert dat mobiliteitsbeslissingen een gezamenlijk besluit zijn. Bovendien verminderen kinderen de waarschijnlijkheid van grensoverschrijdende mobiliteit. Om de arbeidsmobiliteit binnen de EU te verhogen, zouden beleidsmakers de kosten van een verplaatsing waar kinderen bij betrokken zijn kunnen verminderen. Dit kan bijvoorbeeld door investeringen in internationale scholen of EU-brede regulering over overdraagbaarheid van onderwijs. Bovendien kan grensoverschrijdend woonwerkverkeer een mogelijkheid zijn om grensoverschrijdende mobiliteit te verhogen. Om dit te stimuleren, moet sociale zekerheid makkelijker overdraagbaar worden.

Hoofdstuk 4

In hoofdstuk 4 van mijn proefschrift analyseer ik mismatches in het onderwijs voor tweede generatie immigranten. Het arbeidsmarktperspectief voor immigranten is vaak slechter dan voor Nederlanders zonder migratieachtergrond. Als dit verschil na correctie voor verschillende variabelen, zoals ervaring, kwaliteit of taalverschillen, blijft bestaan, wordt dit een zogenaamde 'etnische boete' (ethnic penalty) genoemd. Etnische boetes kunnen

zowel worden veroorzaakt door discriminatie of door niet-waarneembare verschillen in vaardigheden.

Hoewel de verschillen tussen personen met en zonder migratieachtergrond voor bepaalde arbeidsmarktuitkomsten, zoals lonen, uitgebreid onderzocht zijn, hebben mismatches in het onderwijs nog niet veel aandacht gekregen. Mismatches in het onderwijs beschrijven het verschil tussen de opleiding en de huidige functie van een individu. Verticale mismatches zijn mismatches waar de opleiding van het individu niet bij diens huidige functie past. Horizontale mismatches zijn mismatches waar de richting van de opleiding niet bij de huidige functie past.

In dit hoofdstuk onderzoek ik of westerse en niet-westerse tweede-generatie immigranten een grotere kans hebben op mismatches in het onderwijs en op werkloosheid dan hun collega's zonder migratieachtergrond. Het is belangrijk om etnische boetes op de arbeidsmarkt te analyseren omdat mensen die mismatches in het onderwijs ervaren minder tevreden zijn met hun baan en minder verdienen. Bij het vergelijken van resultaten voor personen met en zonder migratieachtergrond is het belangrijk om een relatief homogene groep te analyseren, om te voorkomen dat het verschil door opvoeding of taalproblemen is veroorzaakt. In dit hoofdstuk analyseer ik cross-sectionele enquêtedata, afgenomen onder hbo-afgestudeerden in Nederland tussen 2006 en 2014. Met behulp van deze data is het mogelijk tweede generatie migranten en Nederlanders zonder migratieachtergrond te vergelijken, waarbij het gaat om mensen met hetzelfde opleidingsniveau, die in hetzelfde land zijn geboren en opgegroeid.

Uit de resultaten blijkt dat de kans groter is dat migranten mismatches in het onderwijs en werkloosheid ervaren dan Nederlanders zonder migratieachtergrond. Een etnische boete bij mismatches in het onderwijs blijkt te bestaan. Het is minder waarschijnlijk voor migranten om een juiste match tussen opleiding en functie te ervaren. Bovendien is het voor niet-westerse migranten waarschijnlijker om tegelijkertijd een verticale en horizontale mismatch (een zogenaamde dubbele mismatch) te ervaren. Het is voor westerse en niet-westerse migranten waarschijnlijker werkloos te zijn, waarbij de waarschijnlijkheid onder de niet-westerse deelgroep hoger is. Een etnische boete blijft waarneembaar wanneer er voor andere variabelen, zoals gemiddelde cijfers, studierichting of verschillen in ervaringen, gecontroleerd wordt. Dit hoofdstuk laat zien dat een etnische boete in arbeidsmarktuitkomsten bestaat wanneer een vrij homogene groep geanalyseerd wordt. Er kan niet met zekerheid gezegd worden of deze boete veroorzaakt wordt door discriminatie of door niet-waarneembare verschillen in vaardigheden. Er wordt echter voor veel mogelijke verschillen in vaardigheden gecontroleerd. Ook blijkt uit recent experimenteel onderzoek dat etnische discriminatie

tijdens het sollicitatieproces aanwezig is. Het is daarmee waarschijnlijk dat discriminatie tenminste een deel van de etnische boete, die ik in dit hoofdstuk meet, veroorzaakt.

Curriculum Vitae

Swantje Falcke was born in Mainz, Germany, in 1987. She holds a BSc in Economics from University of Mannheim, Germany, and a MSc (cum laude) in Economics of Public Policy and Management from Utrecht University School of Economics, the Netherlands. In September 2012 she became a PhD candidate at Utrecht University School of Economics, where she completed this dissertation. Swantje has presented her research at several international conferences and seminars, including the ERC General Conference in Glasgow (2014), the SASE Annual Conference in London (2015) and the Nordic Migration conference in Oslo (2016). She participated in the Berlin Summer School in Social Sciences at the Humboldt-University Berlin and the WZB Berlin Social Research Center (2013). As of January 2017, Swantje works as a post-doctoral researcher at Maastricht University, Faculty of Arts and Social Sciences (political science department) on the ERC-project 'Migrant Life Course and Legal Status Transition' led by Prof. Maarten Vink. Her research interests cover public economics, international migration, citizenship and ethnic penalties.

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