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Qualification Structure, Over- and Under-qualification of the Foreign Born in Austria and the EU

Peter Huber, Klaus Nowotny, Julia Bock-Schappelwein

──────────── **Abstract** ────────────

This project focuses on comparing the qualification structure of migrants residing in Austria as well as their over- and underqualification rates to other EU countries. The skill structure of foreign born residing in Austria has improved slightly in the last years. Austria is, however, characterised by a high share of medium skilled migrants and a low share of highly skilled migrants. In addition among the pool of migrants in the EU from a given country, Austria generally selects the less qualified. The location decisions of highly skilled migrants are mostly governed by income opportunities, labour market conditions, ethnic networks and a common official language. Over- and under-qualification rates among the foreign born in Austria largely accord with the European average, the largest part of the differences can be explained by differences in qualification and country structure between the foreign born in Austria and the EU. Native-foreign born differentials in employment rates are, however, significantly higher in Austria than in other EU countries.

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This project focuses on comparing the qualification structure of migrants residing in Austria as well as their over- and under-qualification rates to other EU countries. The skill structure of foreign born residing in Austria has improved slightly in the last years. Austria is, however, characterised by a high share of medium skilled migrants and a low share of highly skilled migrants. In addition among the pool of migrants in the EU from a given country, Austria generally selects the less qualified. The location decisions of highly skilled migrants are mostly governed by income opportunities, labour market conditions, ethnic networks and a common official language. Over- and under-qualification rates among the foreign born in Austria largely accord with the European average, the largest part of the differences can be explained by differences in qualification and country structure between the foreign born in Austria and the EU. Native-foreign born differentials in employment rates are, however, significantly higher in Austria than in other EU countries.

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1. Introduction

In the last two decades (since 1990) the share of foreign born residing in Austria more than tripled. In 1990 a mere 5% of the total resident population in Austria was born outside country. In 2008 this applied to over 16%.[1] This surge in the number of foreign born has led to an intense public debate on the potential effects of migration on the wages and employment prospects of natives[2] as well as appropriate migration and integration policies[3] in Austria. One stylized fact that has gone largely unnoticed in the public debate, however, is that the foreign born in Austria differ markedly in their characteristics from those of other EU-countries. In particular according to data from the *OECD (*2008) in 2001 Austria was the OECD-country with the lowest share of high skilled among its foreign born population (see *OECD*, 2008, *Biffl,* 2006 and *Bock-Schappelwein et al.,* 2008) and, as will be shown below, is also characterized by a structure of migration that is strongly focused on European countries that are not member states of the European Union (EU) as well as on older and female migrants with a longer duration of stay in the country.

These differences in the structure of migration to Austria raise a number of issues which are relevant to the design and workings of migration policy in Austria. In this study we focus on three of these: First, we want to know what factors shape the decision of migrants of different education levels to settle in a country. Second we want to compare differences in labour market integration of the foreign born relative to natives between Austria and other EU-countries and to analyze to what degree the differences found can be explained by differences in the structure of migrants. Third, we analyze how changes of the Austrian migration law in the 1990's impacted on the qualification structure of third country migrants to Austria.

With respect to the first question we build on the results of the theoretical literature on migration networks (see *Bartel* (1989) for a classical contribution), which suggests that in particular unskilled migrants will move to regions where a large number of migrants from the same ethnicity already live as well as on the literature on migrant self-selectivity (see *Borjas* (1999) for a survey), which suggests that highly skilled migrants will migrate from countries with low returns to education to countries with high returns to education, and the literature which analyzes the impact of national institutions on the skill structure of migration (e.g. *Egger - Radulescu,* 2008) to determine which of these factors contributes most significantly to the particularities of the skill-structure of migration to Austria.

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[1] Austria is, however, by no means the only country of the EU where the share of foreign born increased by this much in the last decades, other recent European cases include Ireland (see *Barrett* (2009) for an overview) and Spain (see *Bentolila - Dolado - Jimeno* (2008) for an analysis).

[2] See *Winter–Ebmer – Zweimüller* (1996, 1996A, 1996B)*, Biffl et al.* (1997)*, Hofer – Huber* (1999)*, Huber – Hofer* (2001) for contributions.

[3] See *Biffl – Bock-Schappelwein* (2007)*, Biffl et al.,* (2008)*, Bock-Schappelwein et al.,* (2008A), Bock-Schappelwein, (2004) for contributions to this debate.

With respect to the second question, by contrast, we analyze differences in native to foreign born employment rate differentials across EU-countries. We, however, extend on existing literature by arguing that labour market integration of foreign born workers should not only be measured against the yardstick of employment, but also in terms of the match between migrants' qualifications and jobs (see *OECD* 2007). In particular we follow recent contributions to the literature on the skill-education mismatch, by assuming that such a mismatch can arise both because migrants work in jobs which require qualification-levels lower than suggested by their highest educational attainment (in which case they will be considered as over-qualified) or because migrants work in jobs which require qualification levels, that are higher than their actual level of educational attainment (which will make them under-qualified). In accordance with this literature we also argue that the difference in the level of over-qualification between migrants and natives can be considered a proxy for the difficulties in transferring formal qualifications (of in particular high skilled migrants) across borders, while differences in measures of under-qualification can be considered proxies for the difficulties in transferring work experience (of low skilled migrants). Thus we also analyse the differences in native to foreign born over- and under-qualification rates differentials across EU-countries in a similar way as differences in employment rates.

Finally, with respect to the third question, we consider the experience of accession to the EEA and reforms of residence law in 2003 in Austria and analyze how these policy changes impacted on the skill structure of migrants. Here we use the fact that since the accession to the EEA on the 1st of January 1994, migration law in Austria applies only to migrants from countries which are not member states of the EEA (so called third country migrants). Since thus only migrants from EEA member states were affected by the accession of Austria to the EEA, while third country citizen were not and the opposite is the case for the reform of residence law in 2003, we compare the skill structure of migrants from the EEA and third countries before and after policy changes and apply standard difference-in-difference estimation techniques to evaluate the impact of migration policy the structure of migration.

Given these tasks the structure of this study is as follows: In the next chapter we start our analysis with a comparison of the skill structure of migrants to the European Union and Austria while chapter 3 turns to an econometric analysis of motives of migrants of different skill groups for settling in a particular region. In chapter 4 we compare the labour market situation of migrants in Austria and the EU in terms of employment, as well as over- and under-qualification rates and present results of an econometric decomposition of native foreign differentials both in Austria and the EU. Chapter 5 analyses the impact of accession to the EEA and reform of residence law in 2003 on the skill structure of migrants moving to Austria and chapter 6, finally, summarises our main findings and draws some policy conclusions.

2. The Skill structure of the foreign born in Austria

2.1 Introduction

The literature on international migration has repeatedly stressed that the extent and structure of migration has an important impact on the competitiveness of regions and countries. In this respect a number of studies (see *Guellec - Cervantes*, 2002, *Hunt - Gauthier-Loiselle,* 2008) have shown that highly skilled migrants are an important resource pool, which can be used to strengthen national R&D systems as well as integration into international R&D networks, increase entrepreneurial activity and overcome bottlenecks in regional labour supply. In addition to these advantages it has also been argued that shifting the structure of migration to the more highly skilled also has positive impacts on the income distribution within receiving countries (since highly skilled migrants are – if they increase wage pressures – likely to do so only in the high – skill, high-wage strata of the income distribution) and are – due to their better integration into the labour markets of the receiving countries – less likely to represent a burden on national social security and transfer systems (see *Chiswick,* 2005). While the literature has also argued that these advantages are countered by the potential increase in wage pressures (and potentially unemployment rates) for high skilled labour as well as reduced incentives for training and education of the native population (see for instance *Gould et al.,* 2006), there thus seems to be an almost uniform agreement in the literature that high skilled migration is preferable to low skilled migration.

These potential advantages of high-skilled migration are also reflected in the policy arena. In the face of ageing European societies and growing needs for highly skilled labour a number of EU member states including Austria have implemented migration policies to attract increasing shares of highly skilled migrants. Furthermore also the European Commission (as evidenced for instance by the recent green paper on the European Research Area see *EC*, 2007) acknowledges the fact that "It is ... essential to establish a single European labour market ..., ensuring effective "brain circulation" within Europe and with partner countries and attracting young talent and women into research careers" (*EC*, 2007, p.11).

Despite this high profile of the skill structure of migration in both the academic as well as policy debate existing evidence for Austria also suggests that progress in attracting more highly skilled migrants has been rather limited in the past. A by now quite sizeable number of studies (e.g. *OECD* (2008), *Biffl* (2006) as well as *Bock-Schappelwein et al.* (2008)) find that Austria has the lowest share of high skilled foreign born among all OECD-countries. Furthermore, a recent contribution by *Bellot - Hatton* (2008) suggests that Austria is also one of the few OECD-countries where the average skill structure of foreign born is worse than the average skill structure in the countries of birth of these foreign born, and that thus the foreign born in Austria are negatively selected on education from among their home country population.

These studies, however, almost exclusively either focus on national data sources to identify the determinants of high skilled migration to Austria only or on data collected by the *OECD* (2008) or *Docquier - Mafouk* (2006) which both are for the years 2000 and 2001 compare the structure of migration among the OECD-countries. The data which we use for the majority of this study by contrast provide for a more recent comparison for the years 2006 and 2007 among EU-countries.

In this chapter we thus analyze the differences in the demographic structure of migrants to Austria and EU-countries with this more recent data with the aim of first of all establishing a set of stylized facts and second of all comparing our data to the results of existing studies on the skill structure of Austria. The next section describes the data used in this study, while section 3 presents descriptive evidence on the skill structure of migration to Austria in the years 2006/07 and section 4 shortly describes other aspects of the structure of migration to Austria (such as age and gender). In section 5 we present results of a decomposition analysis of the skill structure of migration to Austria and section 6 finally concludes by summarizing our results and drawing some policy conclusion.

2.2 Data

The data we use for this purpose are taken from the European Labour Force Survey (EU-LFS) for the years 2006 and 2007. In this regular questionnaire a representative sample of households of the 27 European Union (EU) member states (EU 27)[4] is asked on their country of birth as well as on a number of demographic and workplace characteristics (such as occupation, sector of employment, age, gender, highest educational attainment and others).[5] Thus from this data it is possible to estimate both the total number and structure of foreign born residing in the EU 27[6]. Unfortunately, however, in the national questionnaires of Germany and Ireland the question on country of birth is not asked. Thus we exclude these countries from our analysis. Furthermore, in the data 0.2% of the residents in the remaining EU-countries did not respond to the question on place of birth, 0.6% of the foreign born did not answer to the question on duration of stay and 0.8% of the residents did not answer to the question on their highest educational attainment. [7] While these figures seem sufficiently small to allow representative analysis, we exclude from our analysis all persons, who did not answer the

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[4] See: http://circa.europa.eu/irc/dsis/employment/info/data/eu_lfs/index.htm for the questionnaire and its methodology.

[5] See *Hierländer - Huber* (2009) for a detailed description of the data.

[6] In this chapter, as in the whole of this study, in accordance with much of the migration literature we focus on the concept of "foreign born" as a definition of a migrant. This is preferable to the nationality concept since it provides a more complete picture of migration by also including naturalized citizens and (of particular importance for international comparisons) avoids distortion arising from differences in naturalization policies across countries.

[7] Non-response rates are substantially higher in individual countries. In the UK 23% of the residents do not provide their highest completed education and in Denmark almost 27% of the foreign born do not answer to the question of the years of residence. Non response with respect to country of birth, by contrast, is not concentrated on any individual country. The highest non-response rate to this question is found in Denmark, where it amounted to 0.5% of all residents.

question on the highest completed education and place of birth, which results in an exclusion of 1.5% of our sample[8]. In addition, we consider only the active aged population between 15 and 64.[9]

Since our data is taken from a survey, it is also subject to sampling error. We minimize this problem by using averages across two years (2006 and 2007), but in a number of cases the number of foreign born is well below the confidence bounds provided by EUROSTAT. To avoid misinterpretation, we follow the rules of reporting suggested by Eurostat[10] by listing all figures where high standard errors of the estimates may be expected in brackets and suppressing all numbers where levels are below the lower confidence bounds suggested by EUROSTAT.

Figure 2.1: Share of foreign born population by country of residence

Average 2006 & 2007, in % of total active aged population
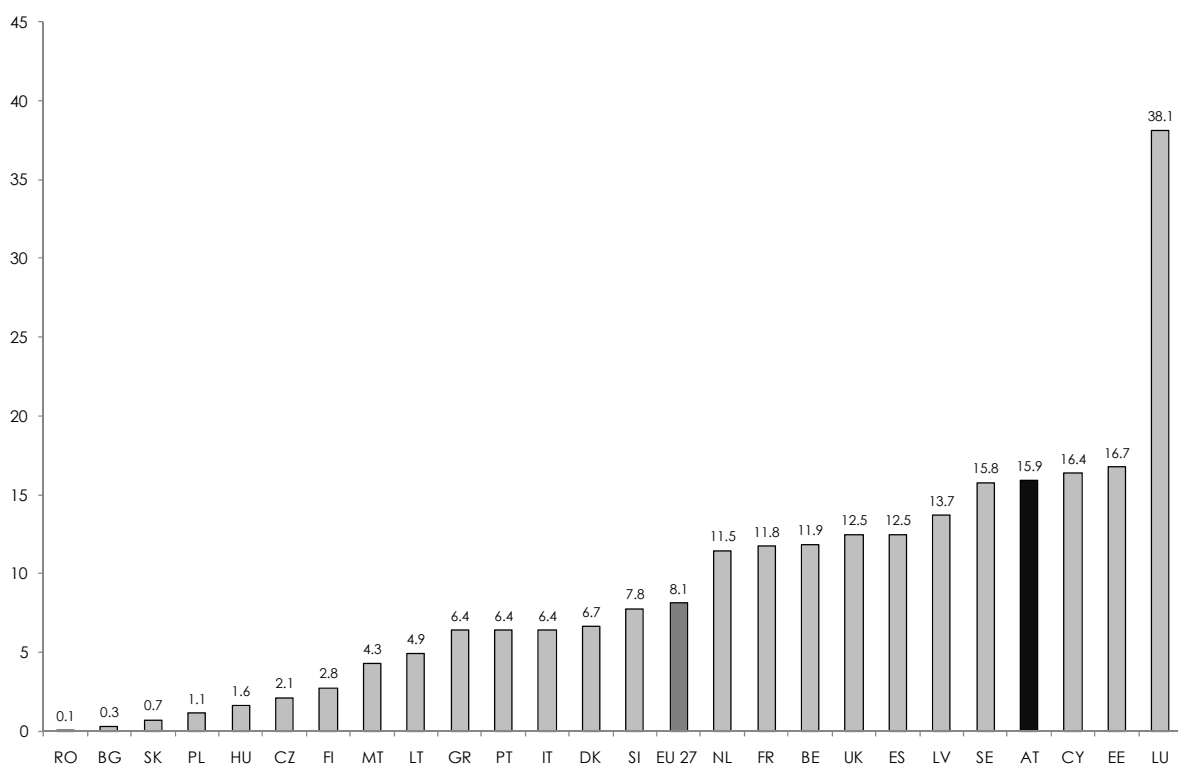
Source: EU-LFS. – Notes: Base population aged 15-64, excluding Germany and Ireland, excluding unkown highest completed education and unknown country of birth.

This data has recently also been used by *EC* (2009) and *Hierländer - Huber* (2009) to compare the foreign born in the EU 27. In these reports Austria emerges as an EU-country with a relatively large share of foreign born among its population. Among the 27 EU-countries,

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[8] We also exclude non-respondents to the question on duration of stay only where this is relevant.

[9] We decided on this age limit since it makes comparison to official sources easier.

[10] See http://circa.europa.eu/irc/dsis/employment/info/data/eu_lfs/index.htm

Austria ranks fourth with respect to this indicator. Only the obvious outlier of Luxemburg (where the share of foreign born among the total resident population reaches over 38%) and the smaller countries of Cyprus and Estonia, have higher shares of foreign born among their resident population than Austria (see Figure 2.1).

At the same time Figure 2.1 also clearly points to a low share of foreign born population among most of the EU 27 countries which joined the EU after May 1st 2004 (i.e. the NMS 12). According to LFS data around 94% of all migrants in the EU 27 reside in the EU 15. Only around 6% reside in the NMS 12 countries.[11] This strong focus on the EU 15 implies that for most of the NMS 12 the number of observations on migrants in the EU-LFS is low, that data cannot be trusted to be informative. Thus – to allow for a representative analysis – we also omit the NMS 12 countries from our sample and focus only on the EU 15 (excluding Germany and Ireland).[12]

2.3 The Education structure of the foreign born in Austria

Our final data thus consist of observations from 13 EU member states which joined the EU before May 1st 2004, and to which we henceforth refer to as the EU 13. According to these data Austria is a country where the education structure of migrants is strongly focused on the medium skill segment of the labour market and where only few highly educated migrants live. 46.7% of the foreign born population in Austria has ISCED 3 or 4 educational level and is thus medium skilled. Behind the UK this is the second largest share in the EU 13. At the same time the share of high skilled migrants is only 16.5% of the total foreign born population, which is the third lowest share. The shares of high skilled migrants were lower only in Italy and Greece. The share of low skilled (I.e. ISCED 0-2) foreign born is 36.5% in Austria and is the eighth lowest among the EU 27.

Our data are thus consistent with the large body of recent comparative empirical evidence cited in the introduction to this chapter, which suggests a low share of high skilled migration to Austria. Our data, however, also suggest a moderate improvement in the relative position of Austria among the EU 13 countries with respect to the skill structure of migration. While previous studies focusing on the years 2000/2001 find that Austria has the lowest share of high skilled migrants among the OECD-countries, our more recent data suggests that since then Austria has at least overtaken Greece and Italy with respect to this Indicator. This may, however, primarily be explained by the high share of recent low skilled migrants to these countries.

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[11] Among the NMS 12 only the Baltic countries (Estonia, Latvia and Lithuania) have sizeable shares of foreign born in their population. These high shares are primarily due to the large number of Russian born residing in this country.

[12] This omission can also be justified on substantive grounds since a number of studies (e.g. *Untiedt,* 2006) suggest that the economic and educational structure of the NMS 12 still differs substantially from that of the EU 15, and that these countries are of only limited comparability to Austria.

Figure 2.2: Share of foreign born population by educational attainment

Average 2006 & 2007, in % of the foreign born active aged population
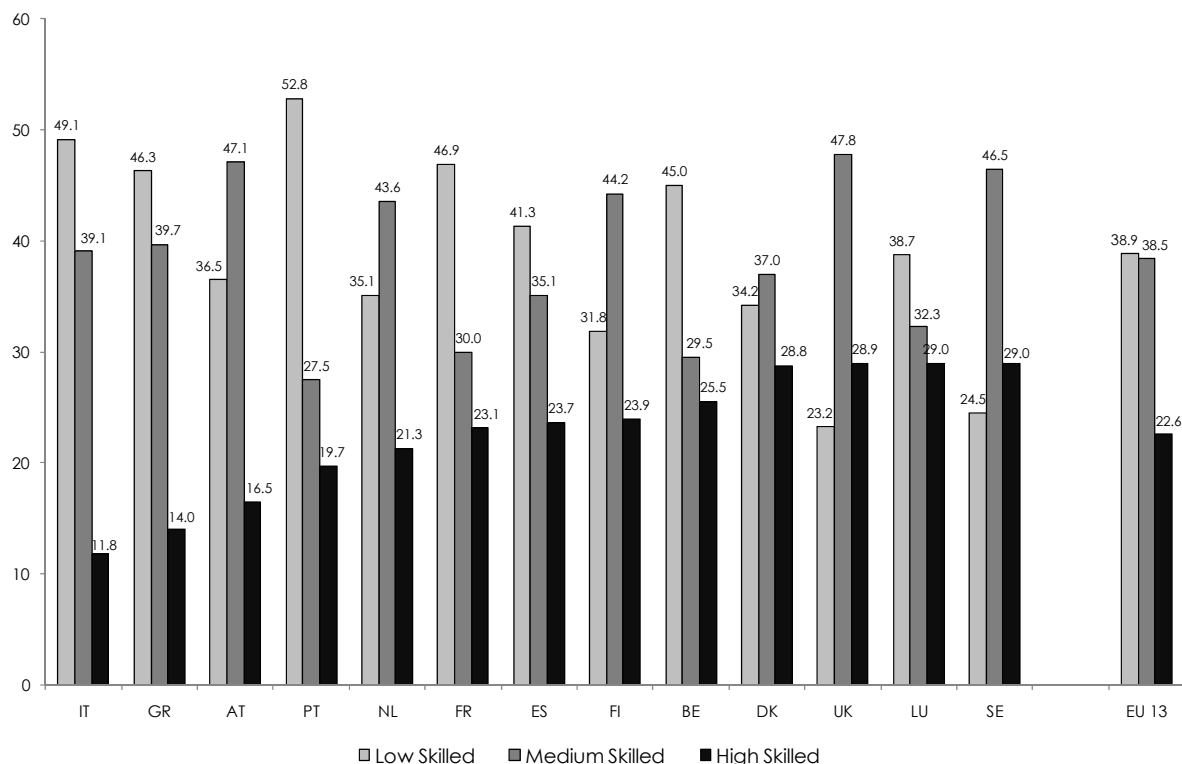
Source: EU-LFS. – Notes: Base population aged 15-64, excluding Germany and Ireland, excluding unkown highest completed education and unknown country of birth. Low skilled = ISCED 0-2, medium skilled = ISCED 3,4, high skilled = ISCED 5 or more.

Furthermore, in contrast to earlier contributions, with the data at our hands, we can also analyse the reasons for these particularities of the education structure of the foreign born in Austria a little further. In particular, comparing the education structure of the foreign born to that of natives (see Figure 2.3) suggests that in many respects the foreign born resemble natives. Austria is also a country with a high share of medium skilled among natives. 62.9% of the Austrians belong to the medium education groups (i.e. ISCED 3 or 4). This is the highest share among all the EU-countries sampled. Similarly the share of natives with tertiary education (high skilled) is only 14.5% (and thus even lower than the share of high skilled foreign born).[13] This is the third lowest share among all EU 27 countries. The share of low skilled

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[13] With respect to these indicators we also checked the position of Austria in the EU 27. Here (after Poland, Slovakia and the Czech Republic) Austria is the country with the fourth highest share of medium skilled active population, holds the seventh lowest share of highly educated, and the eighth lowest share of low skilled.

natives in Austria, by contrast, is 22.6% and the second lowest (behind Sweden) among the EU 13.[14]

Figure 2.3: Share of native population by educational attainment

Average 2006 & 2007, in % of the native active aged population
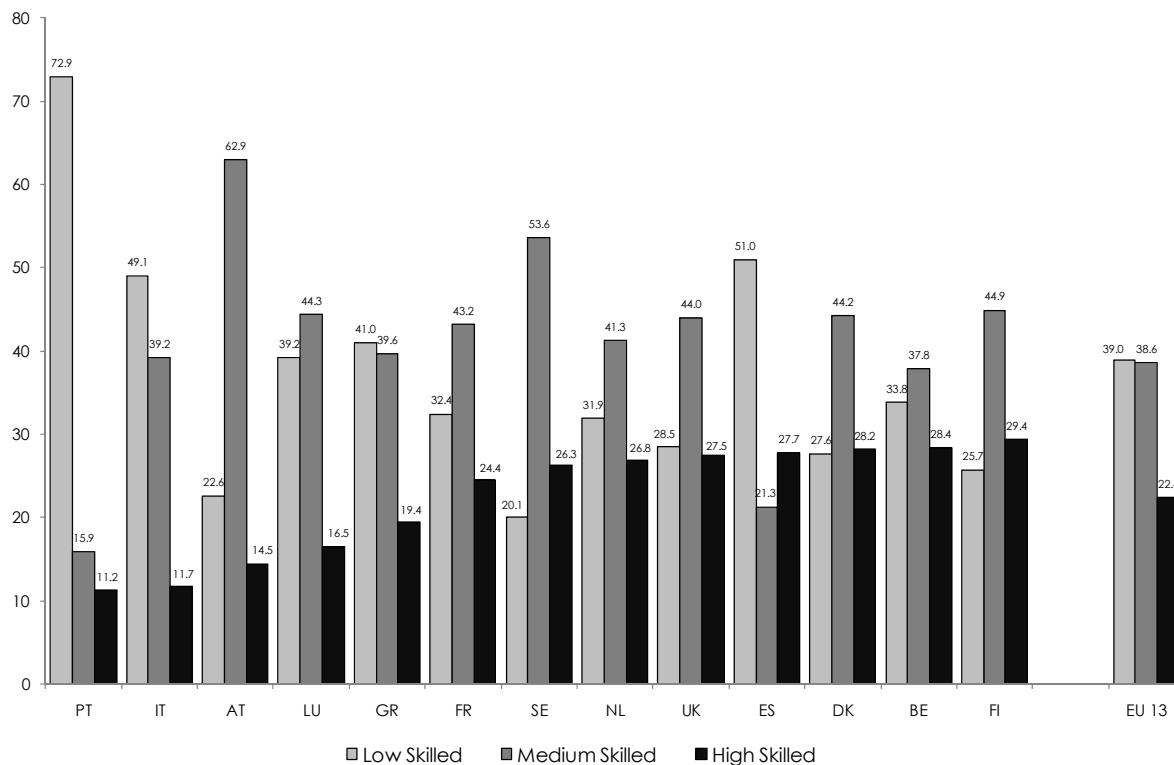
Source: EU-LFS. – Notes: Base population aged 15-64, excluding Germany and Ireland, excluding unkown highest completed education and unknown country of birth. Low skilled = ISCED 0-2, medium skilled = ISCED 3,4, high skilled = ISCED 5.

This thus suggests that a substantial part of the strong focus of the education structure of foreign born on the medium education levels in Austria as well as the low share of highly educated foreign born may be attributed to the aggregate structure of labour demand, while from the point of view of comparison with the education structure of natives the outstanding feature of the foreign born in Austria, is the high share of low skilled.

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[14] Note that these data are consistent with much of the recent evidence on the skill structure of the population in the EU. In particular the very high share of low skilled natives in Portugal is consistent with the evidence provided by *Böheim - Iga - Zweimüller* (2010) as well as official Eurostat sources.

Figure 2.4:   Share of foreign born population by country of residence, educational attainment and country of birth

Average 2006 & 2007, in %

Born in the EU 27

Low Skilled   Medium Skilled   High Skilled

Born in the Rest of the World

Low Skilled   Medium Skilled   High Skilled

Source: EU-LFS. – Notes: Base population aged 15-64, excluding unkown highest completed education and unknown country of birth. Low skilled = ISCED 0-2, medium skilled = ISCED 3,4, high skilled = ISCED 5 or more.

Figure 2.5: Share of foreign born population by country of residence, highest educational attainment, and duration of stay

Average 2006 & 2007, in %

Less than 10 years

(Low Skilled / Medium Skilled / High Skilled)

IT: 47.6, 40.2, 12.1
AT: 38.1, 47.6, 14.3
GR: 42.5, 41.7, 15.8
LU: 45.8, 34.7, 19.5
NL: 36.0, 43.4, 20.6
FR: 48.7, 30.2, 21.2
PT: 53.3, 25.1, 21.7
BE: 47.4, 29.3, 23.3
SE: 25.5, 50.1, 24.4
FI: 27.8, 46.3, 25.9
ES: 28.2, 44.1, 27.7
DK: 29.6, 39.5, 30.9
UK: 26.3, 39.9, 33.8
EU 13: 40.5, 36.7, 22.8

10 years or more

(Low Skilled / Medium Skilled / High Skilled)

IT: 50.6, 38.0, 11.4
GR: 51.5, 37.0, 11.5
PT: 52.0, 32.0, 15.9
FI: 38.9, 40.6, 20.5
AT: 33.2, 46.0, 20.8
ES: 41.3, 37.4, 21.3
UK: 19.5, 57.0, 23.5
NL: 31.7, 44.2, 24.1
FR: 41.6, 29.2, 29.2
BE: 39.5, 29.8, 30.7
DK: 36.5, 32.0, 31.5
SE: 25.6, 34.4, 40.0
LU: 25.8, 27.8, 46.5
EU 13: 37.3, 40.9, 21.8

Source: EU-LFS. – Notes: Base population aged 15-64, excluding unkown highest completed education and unknown country of birth. Low skilled = ISCED 0-2, medium skilled = ISCED 3,4, high skilled = ISCED 5 or more.

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In addition there are also pronounced differences in the education structure of the foreign born by sending country region and by duration of stay in many of the 13 EU-countries. This applies in particular to the education structure by sending country (see Figure 2.4). In general, migrants from third countries[15] have here substantially lower educational attainment levels in Austria than in the average of the EU, while with respect to the qualification structure of migrants from the EU 27 Austria performs much better. For instance the share of low skilled active aged migrants born in the EU 27 in Austria is only 13.8% and thus the lowest among all EU 13 countries. Among migrants born in third countries this share is 47.9%, which is the 5th highest. Furthermore the share of highly skilled migrants born in the EU 27 is 26.9% in Austria and thus substantially higher than the 11.2% among migrants born in third countries.

Similarly with respect to the duration of stay in the country of residence, more recent migrants (i.e. those that reside in the country for less than 10 years) in Austria are better educated than those living in Austria for more than 10 years. The share of highly educated migrants among the more recent migrant cohorts is 20.8% (and thus the 5th lowest among the 13 EU-countries considered in figure 2.5) but 14.3% (and thus the 2nd lowest in the EU-countries) among foreign born residents living in Austria for more than 10 years. By contrast the share of low skilled recent migrants is 33.1% (i.e. 4th lowest among the EU 13) but 38.1% (6th lowest) among those living in Austria for more than 10 years.

The only stylized fact that applies to all groups of foreign born considered in figures 2.4 and 2.5 is the high share of migrants with an intermediate level of education. Here Austria holds the highest share among the migrants born in EU 27-countries, the 4th highest share among migrants born in third countries and the 2nd highest share among more recent migrants as well as the 2nd highest share among established migrants among the 13 EU-countries.

2.4   Age, Gender, Country of birth and Duration of Stay

The marked differences in the education structure of migration between the EU 13 countries and Austria are also accompanied by differences in demographic structure. According to our data 52% of the foreign born in Austria were born in other European countries outside the EU. This after Greece (59.4%) is the second highest share among all EU 13 countries and substantially higher than the European average of 13.6%. Migrants from EU 27 countries, by contrast, account for 33.4% of the foreign born population, which is a share that is about comparable to the average of the 13 EU-countries (28.9%).[16] The high share of migrants born in non-EU 27 European countries thus comes at the expense of substantially lower shares of

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[15] We refer to third countries as all countries that are not member states of the EU 27.

[16] Within this group, however, the share of migrants from the NMS 12 to Austria than in the EU 13 average and the share of migrants from the EU 15 is lower.

migrants born in other continents in Austria, than in the European average. Thus in contrast to most of the other 13 EU-countries migration in Austria is less diversified.[17]

*Figure 2.6: Foreign born population by country of residence and region of birth*
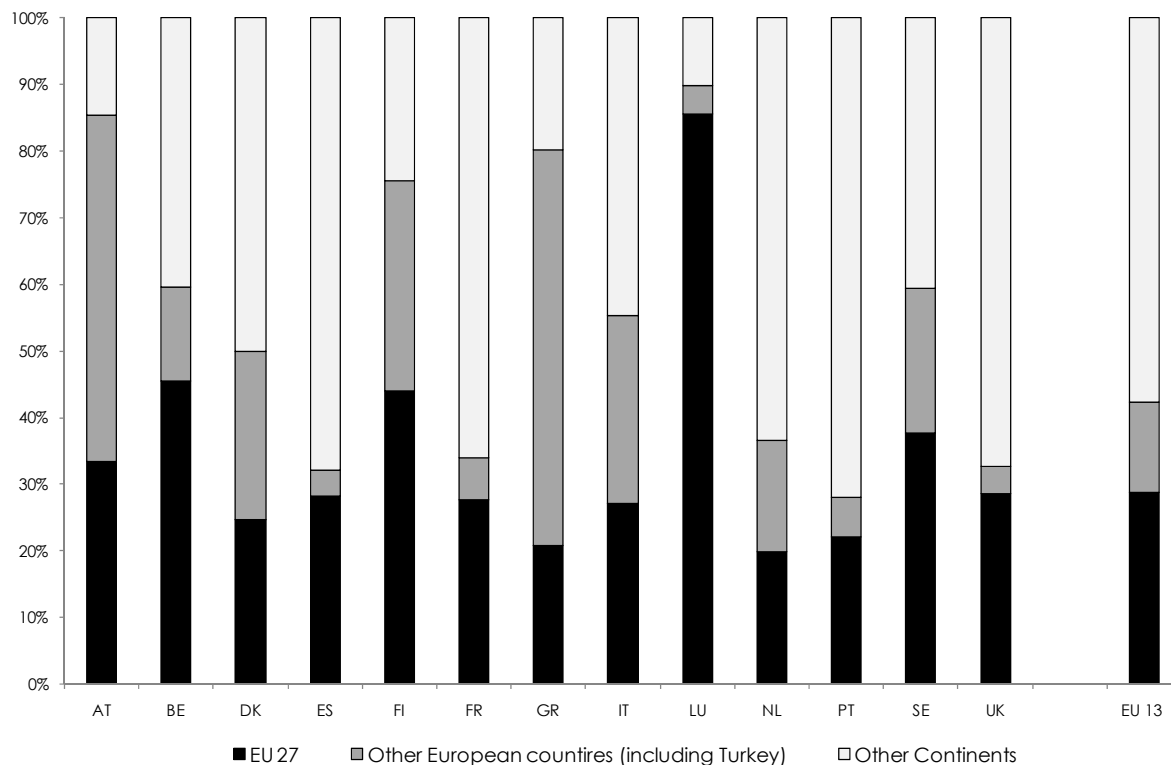
Average 2006 & 2007, in %

Source: EU-LFS. – Notes: Base population aged 15-64, excluding unkown highest completed education and unknown country of birth.

Associated with the high share of migrants from other European countries (who in Austria primarily come from Turkey and former Yugoslavia and entered the country as "Gastarbeiter" – in the 60's and 70's and afterwards in the early 1990s) a large part of the foreign born live in Austria since more than 10 years. More than two thirds of the foreign born in Austria have a duration of stay that is 10 years or longer.[18] The share of such "longer established" migrants is only higher in the Netherlands, Sweden, France and Belgium, while Spain and – to a lesser

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[17] This is also confirmed by OECD data from the population census in the years 2000 and 2001 (see *OECD* 2008). According to this data only the Czech Republic, Hungary, Luxemburg, Poland and Slovakia have higher shares of foreign born from Europe among their foreign born than Austria (see also *Huber*, 2009).

[18] This is also by and large consistent with OECD data from the Censuses of 2000 and 2001. Here, however, differences between Austria and the rest of the EU seem to have increased recently on account of high recent migration to individual EU-countries (such as Spain, Ireland and the UK) and the "aging" of the sizeable migration cohort of the early 1990s in Austria. In 2000 the share of foreign born with duration of stay of less than 10 years was 38.3% according to OECD data, the share of such residents was, however, 40.8%.

degree – Italy have a much higher share of more recent migrants among their foreign born population (see table 2.1).

Table 2.1: Foreign born population by country of residence, gender, age groups and duration of residence

Average 2006 & 2007, in %

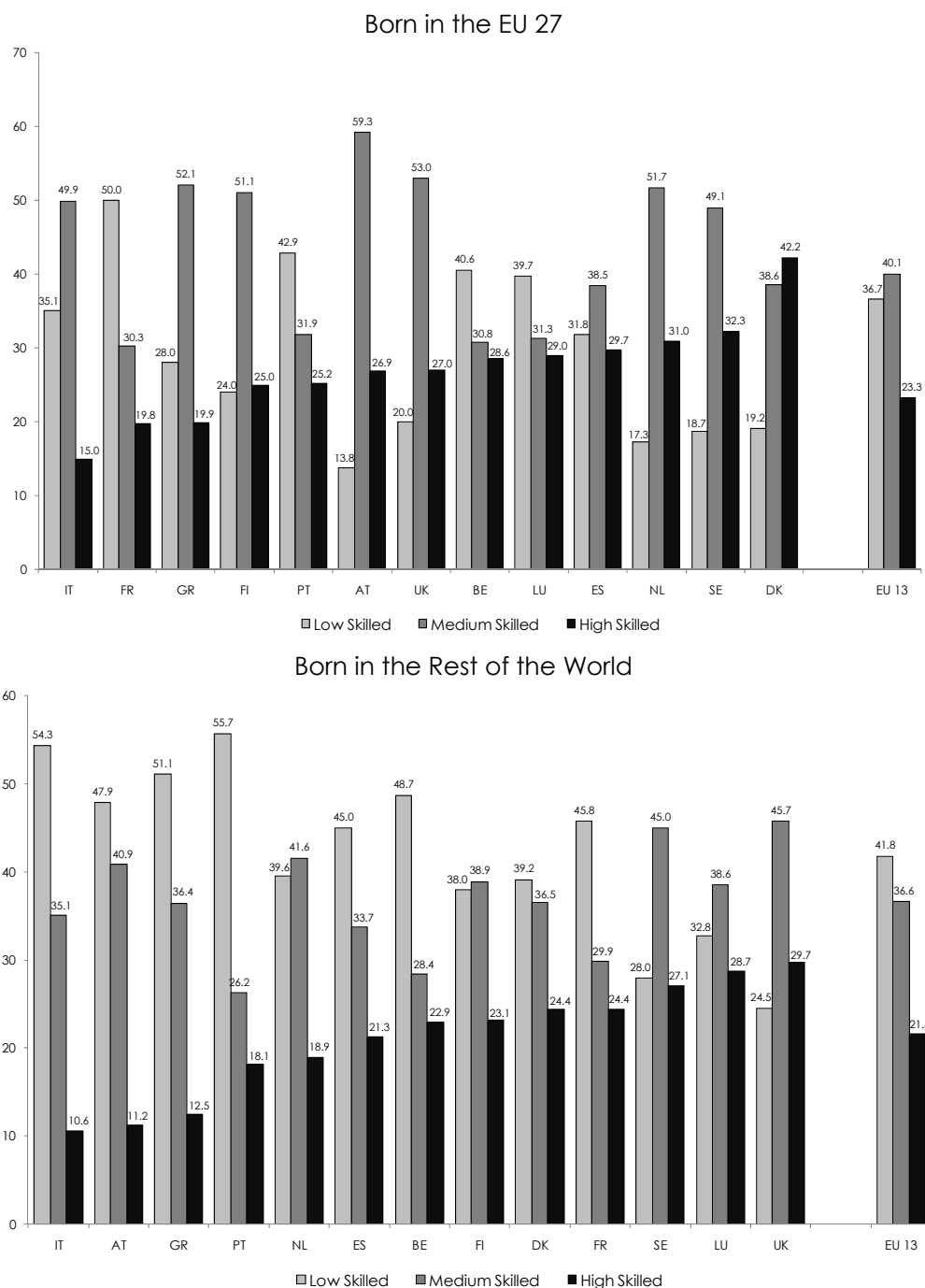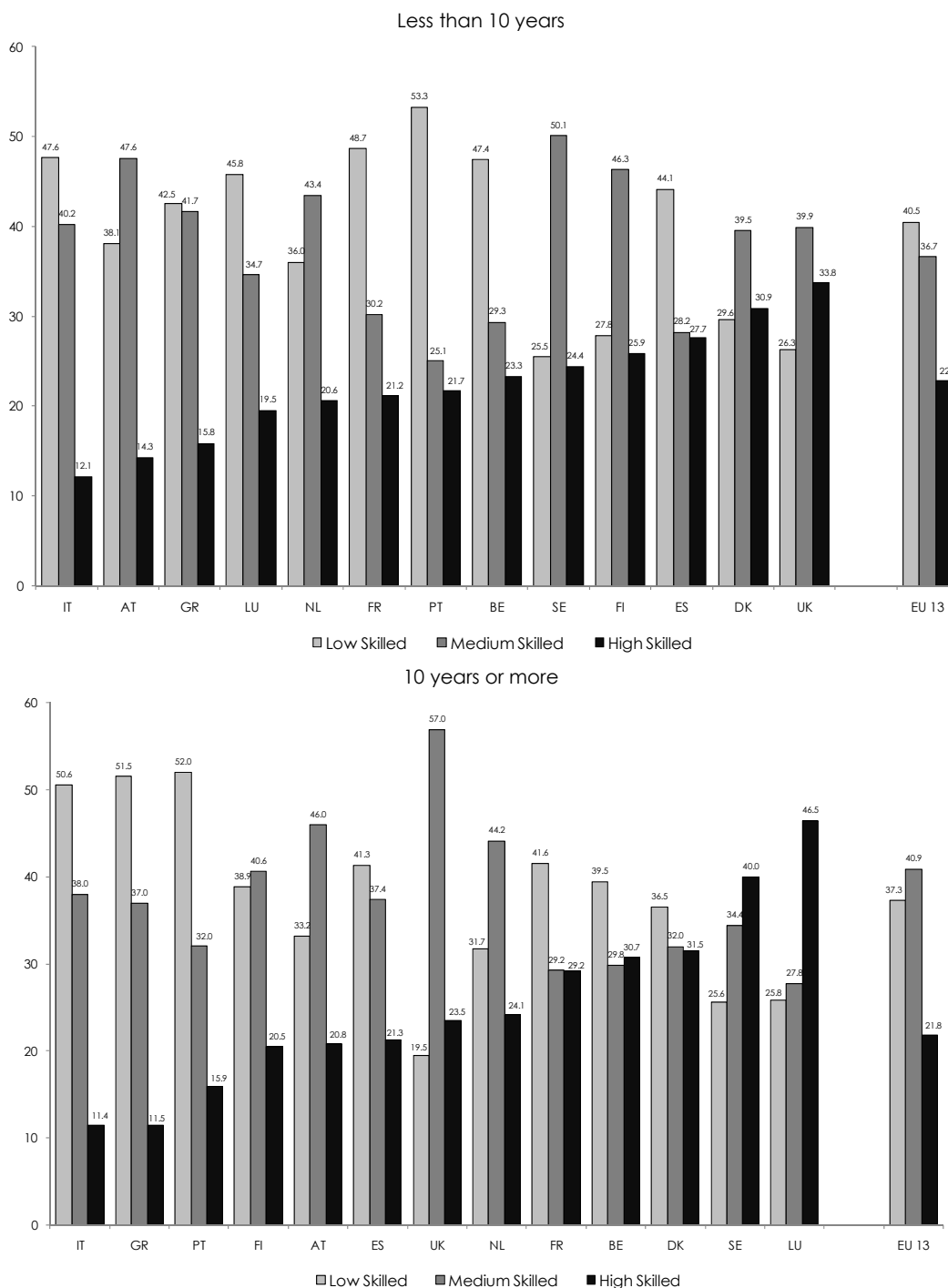|	Gender		Age in years			Duration of stay in years	
	Males	Females	15-24	25-44	45-64	10 or more	1 to 9
AT	47.4	52.6	14.1	51.3	34.5	67.1	32.9
BE	48.4	51.6	12.6	48.5	39.0	69.6	30.4
DK	47.3	52.7	18.7	49.9	31.5	59.0	41.0
ES	48.6	51.4	16.1	64.2	19.7	23.0	77.0
FI	49.6	50.4	20.0	57.1	22.9	65.7	34.3
FR	48.2	51.8	9.2	42.0	48.8	75.4	24.6
GR	48.8	51.2	17.5	58.7	23.8	57.9	42.1
IT	47.5	52.5	13.8	63.7	22.5	51.5	48.5
LU	49.8	50.2	10.4	53.6	36.0	66.0	34.0
NL	47.7	52.3	12.6	52.4	35.0	79.0	21.0
PT	48.6	51.4	15.3	63.2	21.5	65.5	34.5
SE	47.9	52.1	11.7	46.9	41.4	76.4	23.6
UK	49.5	50.5	14.9	55.2	30.0	53.2	46.8
Total	48.4	51.6	13.5	54.7	31.8	56.4	43.6

Source: EU-LFS. – Notes: Base population aged 15-64, excluding unkown highest completed education and unknown country of birth. values in brackets have a low reliability. - = data provides too few observations to be reported.

The longer duration of stay of migrants in Austria also leads to a relatively large share of migrants in the age group of 45 to 64 among the active aged foreign born in Austria. 34.5% of the active aged foreign born in Austria – as opposed to 31.8% in the average of the EU 13 – belong to this age group. At the same time the age group of the 15 to 24 year olds is also slightly overrepresented relative to the EU 13 among the foreign born, while the medium age groups of the 25 to 44 year olds are slightly underrepresented. 14.1% of the active aged foreign born in Austria are 15 to 24 years old, while 51.3% are 25 to 44 years old. In the average of the EU 13 these shares are 13.5% and 54.7%, respectively, with in particular Finland, Denmark and Greece having particularly large shares of young migrants while Spain, Italy and Portugal have a large share of active aged foreign born in the intermediate age groups.

Finally, Austria is also a country where a large share of the migrants is female. 52.6% of the foreign born residing in Austria – as opposed to 51.6% in the average of all EU 13 countries – are female (see table 2.1). Austria after Denmark is the country with the second highest share

of females among the foreign born in the EU 13, which can be attributed to the important role of family reunion in Austria.[19]

2.5 A Shift-Share Decomposition

Descriptive evidence thus suggests that when compared to the rest of the EU 13 the skill structure of foreign born in Austria is characterized by a high share of medium skilled migrants and a low share of highly skilled migrants, while the share of low skilled foreign born is slightly lower than in other EU-countries, but high relative to the education structure of natives. In addition this descriptive evidence also suggests that these particularities of the education structure of foreign born in Austria are closely associated with the particularities of labour demand (in particular with respect to the high share of medium education levels among the foreign born) as well as more low skilled migrants from third countries and (to a lesser extent) more established migrant groups that reside in Austria for more than 10 years.

Our data thus provides some evidence on the skill structure of migrants to Austria, which is by and large consistent with that provided in previous research and adds to existing literature by also indicating that the skill structure of the foreign born in Austria has improved relative at least to some EU-countries in the last decade and that in comparison to other EU-countries the foreign born in Austria are strongly focused on migrants born in European countries, that already reside in the country for more than 10 years and a high share of older and female migrants.

Further insights on the causes for the marked differences in the education structure of the foreign born residing in Austria and the EU can be gained from a shift share analysis. The starting point of this analysis is that the share of foreigners of a particular skill group (h) residing in Austria (s_h^{AT}) as well as the share of foreigners of the same skill group residing in the EU (s_h^{EU}) is by definition equal to the weighted sum of the shares of foreign born from this skill group from a particular country of birth (i) among all foreign born from this country of birth residing in Austria or the EU (denoted as s_{ih}^{AT} and s_{ih}^{EU}, respectively) with the weights equal to the share of foreign born from the country under consideration in total foreign born residing in Austria or the EU (denoted as s_i^{AT} and s_i^{EU}).

Thus the differences between the share of foreign born of skill group (h) residing in Austria and the share of foreign born of the same skill group residing in the EU is formally given by:

(2.1) $$s_h^{AT} - s_h^{EU} = \sum_i s_{ih}^{AT} s_i^{AT} - \sum_i s_{ih}^{EU} s_i^{EU}$$

Furthermore, a prediction of the share of foreign born of skill group (h) residing in Austria assuming that the skill distribution from each and every sending country (i) were equal in both Austria and the EU 13 can be derived by calculating the sum of shares of foreign born from

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[19] This again is consistent with OECD data from 2000 and 2001 (see *OECD*, 2008). According to this data the share of females among the foreign born in Austria is 52.1% and the 7th highest among the European OECD-countries. In contrast to our results, however, in this data Italy and the UK have higher shares of females. These countries were, however, also characterized by substantial male in-migration since 2000.

skill group from a particular country of birth (i) among all foreign born from this country of birth residing in the EU 13 weighted with the share of foreign born from this country in total foreign born residing in Austria (i.e. from $\sum_i s_{ih}^{EU} s_i^{AT}$) subtracting this prediction from the first term under the summation sign on the right hand side of equation (2.1) and adding it to the second term under the summation sign, as well as rearranging, gives the following expression for the differences between the share of foreign born of skill group (h) residing in Austria and the share of foreign born of the same skill group residing in the EU:

(2.2) $$s_h^{AT} - s_h^{EU} = [\sum_i (s_{ih}^{AT} - s_{ih}^{EU}) s_i^{AT}] + [\sum_i s_{ih}^{EU} (s_i^{AT} - s_i^{EU})]$$

The two terms in squared brackets on the left hand side of equation (2.2) represent the two shift share components that explain differences in the skill structure of migrants between Austria and the EU. These have quite intuitive interpretations:

- The first term ($[\sum_i (s_{ih}^{AT} - s_{ih}^{EU}) s_i^{AT}]$) measures the differences in skill structure that would result if the country structure of migration to Austria and the EU were the same and only the shares of a particular skill group coming from these countries differed. It thus measures the selection of migrants from among countries. A positive value of this term indicates that, even after controlling for differences in country structure of migrants, Austria attracts a disproportionately high share of foreign born from this skill group. A negative value implies that, after controlling for different sending country structures, Austria attracts a disproportionately low share of foreign born from this skill group from among all migrants to the EU. This term is thus referred to as the selection effect.

- The second term ($[\sum_i s_{ih}^{EU} (s_i^{AT} - s_i^{EU})]$), by contrast, measures the difference in skill structure that would result if the share of migrants from the skill group were exactly the same for each and every country of birth in Austria and the EU 13. It thus isolates the impact of different country of birth structures of the foreign born on the differences in skill structure between the EU and Austria. Thus it is referred to as the country structure effect. A positive value of this term indicates that Austria attracts a high share of foreign born from countries with a high share of the respective skill group among all migrants in the EU. A negative value implies that many of the migrants come from countries of birth that have only a low share of the respective skill group among their foreign born in all of the EU.

The overall results of this decomposition analysis for the shares of low, medium and high skilled migrants are reported in the last row of table 2.2. They suggest a dominance of the selection effect in all cases except the share of high skilled migrants. For instance they suggest that if Austria had received the same share of low skilled migrants as the EU 13 average from each and every sending country, the share of the low skilled migrants would actually be by 0.8 percentage points higher in Austria than in the EU, although the share of low skilled migrants residing in Austria is actually by 6.2 percentage points lower than in the EU 13. Thus the lower than average share of low skilled foreign born is solely due to the selection effect. This effect suggests that if the country structure of migration were the same in Austria and the EU, the

share of low skilled among the foreign born would be by 3.4 percentage points lower than in the EU 13.

Table 2.2: Results of a shift share analysis of the skill structure of migration to Austria

	Total Effect			Country Structure Effect			Selection Effect		
	Educational attainment level								
	low	medium	high	low	medium	high	low	medium	high
EU 15	−4.5	1.5	0.2	−1.5	−1.1	−0.3	−3.0	2.5	0.5
EU 12	0.0	5.9	1.7	1.7	3.9	2.1	−1.7	2.0	−0.4
Other Europe	12.1	13.8	1.1	11.3	11.5	4.2	0.8	2.3	−3.1
Turkey	8.5	2.5	0.3	7.4	3.3	0.7	1.2	−0.7	−0.4
Africa	−11.3	−6.6	−4.3	−10.7	−7.0	−4.5	−0.6	0.3	0.3
Americas, Austrailia & Oceania	−5.2	−6.3	−3.4	−5.1	−6.2	−3.6	−0.1	−0.1	0.2
South & Southeast Asia	−1.7	−2.1	−1.3	−1.9	−2.0	−1.2	0.2	−0.1	−0.1
Other Asia	−0.5	−0.2	−0.3	−0.3	−0.4	−0.3	−0.2	0.2	0.0
Established	2.7	11.3	−3.3	4.8	6.7	−0.9	−2.1	4.5	−2.4
Recent	−5.3	−2.7	−2.7	−4.0	−4.6	−2.1	−1.3	1.9	−0.6
Total	−2.6	8.5	−5.9	0.8	2.1	−2.9	−3.4	6.4	−3.0

Source: EU-LFS. – Notes: Base population aged 15-64, excluding Germany and Ireland, excluding unkown highest completed education and unknown country of birth and unknown duration of stay (differences to figure 2.2 due to exclusion of foreign born with unknown duration of stay and rounding errors).

Similarly the by 8.5 percentage points higher share of medium skilled migrants in Austria in its majority can be attributed to the selection effect. Here if Austria had exactly the same education structure among its migrants from each and every sending country as the EU 13, the share of medium skilled migrants would be only by 2.1 percentage points higher in Austria than in the EU. Thus 6.4 percentage points of the total difference can be accounted for by the fact that within sending countries Austria attracts a disproportionly large share of medium skilled migrants. Thus here too the selection effect accounts for the majority of the differences.

The only exception to this is the difference in the share of highly skilled foreign born in Austria. Here the country structure effect suggest that even if Austria received the same share of high skilled migrants from each country as the EU the share of high skilled would still be by 2.9 percentage points lower than in the EU. Thus this effect explains almost half of the total 5.9 percentage points lower share of high skilled migrants than in the EU. The remaining 3.0 percentage points, however, are due to the selection effect. Thus the foreign born in Austria from a particular sending country are also in average less often drawn from the high skilled.

In sum thus these results suggest that the marked differences in the education structure of foreign born living in Austria are to a large degree due to selection and that only with respect to the share of high skilled migrants does the country structure play a significant role in the explanation of these differences.

While we are unable to distinguish whether this strong selection is due to the particular structure of labour demand in Austria or the impact of Austrian migration policy, the findings with respect to the contribution of individual groups of foreign born to the total selection effect do provide some indication as to among which foreign born selectivity is most relevant. In particular these results suggest that a large part of the selection effect is explained by more established migrants that reside in Austria for more that 10 years and that – relative to the EU 13 – a particularly low share of the high skilled in Austria are born in other European countries, while the positive selection among medium skilled seems to by primarily due to a disproportionately high share of medium skilled foreign born from the EU 15, NMS 12 and other European countries. The share of low skilled by contrast is substantially higher than in the EU 13 average among the foreign born from Turkey.

2.6 Summary

In sum the results of this chapter suggest that in comparison to the EU 13 the skill structure of foreign born in Austria is characterized by a high share of medium skilled migrants and a low share of highly skilled migrants. At the same time the share of low skilled foreign born is slightly lower in Austria than in other EU-countries, but high relative to the education structure of natives. This thus points to rather unfavourable position of Austria with respect to the skill structure of the foreign born both relative to other EU-countries, that in their vast majority manage to attract more high skilled foreign born, as well as relative to the skill structure of natives, that substatially more often have a medium skill level than the foreign born.

In addition the descriptive evidence collected in this chapter also suggests that these particularities of the education structure of foreign born in Austria are closely associated with the particularities of labour demand (in particular with respect to the high share of medium education levels among the foreign born) as well as more low skilled migrants from third countries and more established migrant groups that reside in Austria for more than 10 years.

These findings are also confirmed by a shift share analysis of the skill structure of migrants. This analysis, however, also indicates that the larger part of these differences in skill structure between Austria and the EU is due to the selection of migrants within country of birth groups rather than to an unfavourable country of birth structure of the foreign born. The only exception to this is the low share of high skilled migrants, which arises almost to equal parts from an unfavourable country structure as well as from a negative selection of the highly skilled foreign born within country of birth groups. Furthermore our results also suggest that more established migrants contribute more strongly to these patterns of selection than recent migrants and thus suggest some change in the selection of migrants in recent years in Austria.

From a policy perspective this underlines the importance of not only focusing on changing the country structure of migration but also changing the mechanism of selection of migrants by skills if a more highly skilled structure of the foreign born is sought for. Unfortunately with the data at our hands, however, we are unable to identify, whether the causes for this strong selection of mostly low and medium skilled migrants and can thus not determine whether they are rooted in the effects of migration policy, other elements of economic policy (such as for instance tax and income policies) or in the structure of labour demand and can thus not draw firm policy conclusions as to which factors contribute most to selectivity.

3. Determinants of the location choice of migrants in the EU 13

3.1 Introduction

The theoretical literature on migration suggests that a number of factors may impact on the skill structure of migrants. For instance, as highlighted by the so-called welfare magnet hypothesis (see, e.g., *Borjas*, 1999a, *Levine – Zimmermann*, 1999), differences in social security systems as well as the taxation system can affect the locational choices of migrants with different skill levels. Low-skill migrants who face a higher probability of becoming unemployed may prefer countries with more generous social insurance systems, while high skilled migrants, who are more likely to earn high incomes, may shun countries with high progressivity of the tax system. Similarly, migration laws clearly may also impact on the skill structure of migrants, depending on the selectivity of this migration regime.

One aspect that has, however, gone largely unnoticed in this literature is that aside from these factors ethnic networks also can play an important role in determining the skill structure of migration. While a by now relatively large literature starting with *Bartel* (1989) documents that the choice of target country of a migrant is positively influenced by the presence of migrants of the same nationality in the same region (i.e. migrant networks) and a number of contributions suggest that the importance of networks varies with the migrant's level of education (for instance if low-skill migrants prefer regions with large ethnic networks, while high-skill migrants avoid such regions to escape statistical discrimination (*Stark*, 1994)), only few papers have so far empirically analyzed the role of networks in shaping the skill structure of migration. This is somewhat of a shortcoming in terms of migration policy because as pointed out in the migration literature, networks may cause a "lock-in" effect that may reduce the effectiveness of policy instruments to influence the structure of migration.

This chapter thus analyses the locational choice of migrants to the EU 15 with a special emphasis on differences in the determinants of locational choice by skills. In particular we use the data set described in the last chapter to analyse the choice of target region within countries. Our primary aim is to determine the relative importance of ethnic networks and variables indicating economic and social conditions in the target countries as well as a number of policy variables (such as social security and tax systems as well as migration laws) in determining the skill structure of migrants by linking variables measured both at the national and regional (NUTS-2) level to estimate an empirical model of the location choice of migrants.

The remainder of this chapter is organized as follows: the next section provides an overview of the empirical and theoretical literature on factors determining the location choice of migrants. Section 3.3 focuses on the predictions of this literature for the differences in the location choice of workers of different skill levels. Section 3.4 describes the data used and develops the empirical method applied in section 3.5. Section 3.6 concludes.

3.2   Overview of the literature on location choice of migrants

To determine the variables of interest for our analysis we draw heavily on various strands of the migration literature. This literature at the most basic level suggests that differences in economic opportunities (e.g., probability of finding a job or income opportunities) can be assumed to influence the location choice of migrants. According to the standard neoclassical model of migration individuals will move to countries where they expect to earn a higher income (given differences in costs of living) and/or where they expect to find employment. Given an expected income and an expected probability of finding employment, individuals will furthermore – ceteris paribus – prefer countries closer to their country of origin if costs of migration increase with distance.

Network migration

Aside from these factors, however, a range of other factors have been shown to be important for the country choice of migrants. One of these factors is ethnic networks. Since a seminal study on migrant concentration in the U.S. by *Bartel* (1989) there is a long list of empirical results supporting the network migration hypothesis, most of which, however, focus on the U.S. while there are only few studies covering European countries or the European Union.[20] In addition several hypotheses have been developed to explain the phenomenon that migrants tend to settle where other migrants from the same country of origin migrated before, resulting in a geographic concentration of migrants with similar ethnicity in specific locations. One of the most frequently cited theories is that migrant networks, which produce externalities for members of the same ethnic group because the costs of migration decrease with the number of previous migrants. This leads to "self-perpetuating" migration (*Massy* et al., 1993; *Carrington – Detragiache – Vishwanath,* 1996) from a specific source country. Above reducing migration costs, networks can also provide help with the settlement process, decrease the perceived alienation in the host country (*Bauer – Epstein – Gang,* 2000) or provide financial assistance (*Munshi,* 2003).

It is also often argued that networks can provide their members with ethnic goods like food, clothing, social organizations, religious services, media (like radio, newspapers, etc.) or marriage markets (*Chiswick – Miller*, 2005), which will make migrants more willing to move to a certain region. Since the provision of ethnic goods is likely to increase with the stock of migrants with similar ethnic background in a region, this will create incentives for other

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[20] Among the exceptions *Pedersen – Pytlikova – Smith* (2008) estimate the determinants for migration flows to 22 OECD countries and find a robust and sizeable effect of ethnic networks on the volume of migration flows. Furthermore, in a country study on Denmark; *Damm* (2009) shows that the relocation hazard of refugees randomly assigned to a municipality during the Danish spatial dispersal policy is lower for those assigned to a municipality with a higher percentage of co-nationals. *Åslund* (2005) found similar effects for immigrants to Sweden subject to the "Whole of Sweden Strategy" as well as a preference of migrants for regions with larger ethnic networks before the implementation of the strategy. *Geis – Uebelmesser – Werding* (2008) found networks to have a positive (but decreasing) effect on migrant's choice between four OECD countries (France, Germany, United Kingdom, and the U.S.).

immigrants to settle in regions where they can enjoy a larger supply of ethnic goods. Thus according to this theory the concentration of migrants will be the more pronounced the higher the share of ethnic goods in the migrants' consumption basket and the more dissimilar the host and target cultures. In addition if there are economies of scale in the production of ethnic goods (as can be expected for instance for religious services or media), this geographic concentration will be more efficient than a distribution over various regions, because the lower price of ethnic goods reduces the costs of living (especially if ethnic goods make up a large part of the consumption basket), which attracts more immigrants to move into this region even if they could earn a higher wage somewhere else (*Chiswick – Miller*, 2005).

Furthermore, migration networks can also have a positive effect on labor market prospects. By being in contact with previous migrants, new arrivals can benefit from a better availability of information and increased labor market opportunities (*Gross – Schmitt*, 2003) or benefit from job referrals by more established members of the network (*Munshi,* 2003).[21]

Finally, recently *Epstein* (2002) and *Bauer – Epstein – Gang* (2005) have argued that herd behavior can constitute another explanation for the clustering of migrants in specific regions and can thus help explain the location choices of migrants. According to the authors, this occurs if there is imperfect information as to which among alternative target locations provides the highest utility. If a potential migrant observes only the outcome of previous migrants' destination choices, but not the "signal" that determined their choice, she might discount her private information about alternative target regions and follow the flow of previous migrants in the belief that they must have had information which is not available to her.[22]

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[21] This hypothesis also finds some support in the empirical literature. For instance, *Edin – Fredriksson – Åslund* (2001) find evidence for a statistically significant positive effect of ethnic concentration on migrant earnings and *Munshi* (2003) provides evidence that networks not only increase the probability of employment, but also help to channel network members into higher paying occupations. Other studies, however, showed that clustering negatively influences the economic success of migrants (*Bartel,* 1989, p. 388). One explanation for this is that migrant concentration may impact negatively on incentives for migrants to acquire host country specific skills (such as language skills). Lazear (1999) shows that native language fluency is negatively correlated with geographic concentration of migrants, *Bauer – Epstein – Gang* (2005) present evidence that ethnic enclaves lead to "language traps", attracting migrants with poor or no knowledge of the host country's native language and sustaining the migrants' poor language abilities and Blom (1999) shows that this separation can have a negative effect on earnings and tends to increase with the cultural distance between the immigration group and the native population (*Blom,* 1999). Although some authors such as *Damm* (2009a) concludes that the positive effects of ethnic networks more than outweigh the negative effects, so that the overall effect of living in a region with a larger ethnic network has a positive effect on wages for workers of all skill levels, we would thus argue that the question of whether ethnic concentration is good or bad remains an open issue in the economic literature.

[22] As with chain migration herd behavior can also lead to inefficiencies if previous migrants also discounted their private information in favor of the belief that those who went there before them had information they do not have, while they could have gained a higher utility by following their private information (which must, however, not be the location with the objectively best conditions either). Herd behavior and network effects are – although conceptually different – not mutually exclusive: both effects can exist simultaneously and determine the location decisions of migrants. The presence of network externalities in this context can even increase the probability that herd behavior will be observed (*Epstein,* 2002).

Welfare magnets

Another factor that may impact on the location choice of migrants are differences in welfare provision. As the so-called "welfare magnet" hypothesis predicts, generous welfare systems can attract immigrants, especially those with the highest risk of becoming unemployed. Generous welfare systems might even attract migrants who would not have migrated otherwise or can keep migrants already living in generous welfare states from returning to their home countries (see *Borjas, 1999a*). Income-maximizing migrants should thus be clustered in countries or states with more generous welfare systems, while welfare-receiving natives are (more or less) randomly distributed across countries.[23]

Empirical evidence on the welfare magnet hypothesis can be found in *Borjas* (1999a), who concludes that welfare-receiving immigrants in the U.S. show a higher degree of clustering. Furthermore, the author shows that the "benefit elasticity" – the rate with which the welfare participation increases as a response to changes in welfare benefits – is larger for migrants than for natives. *Levine – Zimmerman* (1999), on the other hand, find no support for the welfare magnet hypothesis in their analysis of moves within the U.S. This result may, however, be related to the fact that the costs associated with moving to another state are larger than the gains in terms of higher welfare payments for those already living in the U.S. and does thus not contradict the findings of *Borjas* (1999a) for migrants to the U.S., for which the costs of moving to one state or another are virtually zero once the costs of moving to the U.S. are borne.

Again, most of the empirical literature focuses on migration to or within the U.S., while there are only few studies for the EU or single European countries. In their analysis of migration flows to 22 OECD countries, *Pedersen – Pytlikova – Smith* (2008) find only weak and results for their welfare generosity proxies (public social expenditure as a percentage of GDP) which are even negative in some regressions. On the other hand, results by *Åslund* (2005) or *Damm* (2009) point to welfare seeking behavior by immigrants to Sweden and Denmark, respectively. The variables used to measure local welfare generosity are, however, debatable. *Åslund* (2005) uses the take-up rate for social assistance, while *Damm* (2009) uses the percentage of right-wing votes at the latest local election. One problem in this context is that the generosity of the welfare system hardly varies within European countries in contrast to the U.S., where welfare entitlement and level are determined at the state level. Effects are therefore hard to identify in single-country studies because of a low variation in the explanatory variable. *Geis – Uebelmesser – Werding* (2008) find mixed effects for their proxies for welfare generosity. On the one hand, they estimate a negative effect of pension

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[23] The reason for the latter is that mobility is costly, and most natives thus prefer to stay in their home countries even though other countries or states offer higher benefits because the increase in benefits does not exceed the costs of moving. Migrants to a country, on the other hand, have already incurred the costs of moving abroad, and the marginal costs of choosing a specific destination country over another (at least within a defined geographical area) are rather small (*Borjas, 1999a*). Welfare recipients (or those most likely to depend on welfare payments, e.g., low-skilled workers) among new immigrants should therefore be clustered in those countries that offer the most generous welfare benefits.

replacement rates on country choice, which can – according to the authors – be attributed to a higher "implicit tax" associated with more generous pension systems. On the other hand, they find positive effects of the quality of health care and educational systems as well as the unemployment replacement rate on migrants' choice of a host country.[24]

Other factors affecting location

Besides economic conditions, ethnic networks and social security systems, other factors can also affect the locational choice of migrants. For instance local characteristics, such as cultural institutions or climatic conditions – also called local "amenities" which affect the individual's quality of life – constitute another factor determining the choice of target location. The explanatory power of amenities, however, depends on whether their value is "capitalized" in (i.e., reflected by) local wages and housing prices. But other interpretations are possible. *Krupka* (2009) in a recent paper hypothesized that individuals "invest" in appreciating the amenities of the region they were born in, and thus prefer target locations with amenities similar to those of the region they were born in. The author found broad support for his hypothesis in an empirical analysis using U.S. data.

Another important aspect for international migration is income taxation, as it affects the net income available in the target country. Apart from the effective tax rates, the progressivity of the tax system can also influence the skill distribution of migrants to a specific country (*Egger – Radulescu,* 2008). *Geis – Uebelmesser – Werding* (2008) find a negative effect of the income tax wedge on country choice. Country size also affects the sorting of migrants across countries and regions: it can be expected that larger regions are, all else equal, chosen more often. Furthermore, *Egger – Radulescu* (2008) bring forward the argument that migration flows closely follow bilateral FDI flows, which favor large countries.[25])

The probability of a migrant choosing a particular country can also be expected to be larger if the prospective host and home countries share the same language, which reduces the costs of migration (and the costs of staying in the host country) considerably (see *Pedersen,* 2008). Furthermore, knowledge of the host country's language can also raise the returns-to-skill in the host country (*Grogger – Hanson*, 2008). (Former) colonial ties between two countries can also affect the locational choice of migrants, e.g., because of cultural similarities if the colonial power "exported" part of its "culture" (or legal code etc.) to the (former) colonies.

Finally, also the migration regime of countries may have an impact on the settlement decision of migrants. With respect to this variable most migration receiving countries have

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[24] Network effects also play a role in this context. *Bertrand – Luttmer – Mullainathan* (2000) show in an empirical study that a larger network increases the probability of welfare participation for individuals from high welfare language groups, and that social networks strongly influence welfare participation. Regions with high concentrations of migrants will thus face an increased burden in terms of social security provisions, but also because of a higher demand for public goods (*Bartel,* 1989, p. 390).

[25] See *Bergstrand – Egger – Larch* (2008) for a theoretical approach to linking FDI and migration flows.

developed a highly differentiated system of residence and work permits for foreign born that often differentiate among migrants of different skill levels.

3.3 Migration of highly skilled workers

Thus different theories of migration suggest a number of variables which may determine the level of migration. These theories, however, also make different predictions on the structure of migration. Migration motives of highly skilled workers' may differ from those of low skilled workers. While it can be safely assumed that – as in the basic neoclassical model of migration – also for highly skilled movements abroad are induced by economic incentives (like income opportunities), the literature has identified a number of points where distinctions between migration in general and migration of highly skilled individuals can be made. This applies especially to migration between developed countries where – in contrast to migration from developing to industrialized countries – the differences in income opportunities are not as pronounced. In particular on the individual level, "push" and "pull" factors will affect the migration decisions of highly skilled workers on an individual level. For instance the importance of career motives as push and pull factors for high-skilled migration was highlighted by *Körner* (1999): working abroad (at least for some time) increases the income opportunities of the highly skilled, both abroad and in their home countries. Furthermore, the prospect of better (on the job or vocational) training, research and education possibilities abroad constitutes a "pull" factor for highly-skilled migrants. Especially highly skilled individuals from developing countries will prefer to work abroad if there is a lack of career advancement opportunities in their home countries (*Körner* 1999, *Mahmood – Schömann* 2003).

With respect to the determinants discussed in the previous section, networks can also have an important effect on the skill composition of migrants. E.g., as networks facilitate family chain migration, they can – at an individual level – generate incentives to drop out of education at an early stage, especially if education is non-portable. Thus, remittances can lead to a negative selection of migrants, inducing the migration of low-skilled followers (*Miranda*, 2007).

This is also consistent with the proposition often found in the literature that the "pioneers" (i.e., those among the first wave of migrants) are "likely to be the most able" (*Lazear,* 1999, p. 118), e.g. because they can expect the highest returns from migration and will thus find it easier to cover migration costs. Low-skilled followers on the other hand will find it worthwhile to wait until the network has grown and migration costs have fallen. Furthermore, as *Stark* (1994) has shown, under asymmetric information – i.e., when employers have no information on the true skill (or effort) of applicants – low-skill (or low-effort) workers might choose to relocate to regions where a considerable stock of high-skilled migrants settled before. By doing so, they can mingle with these high-skilled (or high-effort) migrants to obscure their skill signals to employers. E.g., if employers observe that migrants with a specific ethnic background have good skills and/or show high work efforts, they might be predisposed to hire other workers with the same ethnic background. If employers cannot observe skill or effort beforehand, low-

skilled followers can use this predisposition to earn higher wages, leading to a negative selection of migrants by skills.[26]

Eventually, if the proportion of low-skilled migrants becomes too large, this predisposition might cease or reverse, and followers are no longer able to exploit employers' asymmetric information. High-skilled followers will then find it no longer profitable to move to this region, and high-skilled migrants already living there will consider relocating to other areas where their skills are not obscured by low-skill migrants. This is consistent with the observation that high-skilled migrants are more dispersed and less concentrated in specific areas, while concentration was found to be highest among low-skilled workers (*Bartel,* 1989; *Åslund,* 2005).

With respect to the "welfare magnet" hypothesis, generous welfare systems especially attract those immigrants with the lowest skills (or, e.g., with the highest risk of becoming unemployed), once the selection of migrants (with respect to the source country) has taken place.[27]

In sum the economic literature has identified a variety of variables which can help explain the location choice of migrants across countries and regions. There is, however, only limited evidence concerning the relative importance of the factors summarized in this section. Most of this evidence, however, suggests that the presence of other migrants from the same country is the primary factor driving the choice of a migrant's target location, while economic conditions are of lesser importance, as are welfare benefits (see, e.g., *Zavodny,* 1999, *Pedersen – Pytlikova – Smith,* 2008) and the tax system. The relatively low importance of economic conditions can partly be explained by the fact that most migratory steps are not "speculative", but "contracted", i.e., individuals migrate only if they have a job offer abroad (*Molho,* 1986, *Westerlund,* 1997). Thus, it is likely more important to have fellow countrymen abroad which can provide information about job offers and help with finding a job before moving abroad than focusing on the general economic conditions.

Also the literature tends to find a relatively low importance of welfare benefits (compared to network effects). This can be attributed to the fact that in most countries migrants are not eligible for social security benefits right away and have to spend some time in the host country's labor market before receiving the same welfare entitlements as natives. Nevertheless, the generosity of the welfare system can play a role because a move to a region or country with a better social security system can be seen as an investment into future social security protection.

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[26] This theoretical argument is supported by the empirical results of *Damm* (2009a), who finds evidence that the return to living in a region with a larger network (in terms of annual income) increases with the "quality" (i.e., the skill composition or the mean annual earnings in the ethnic enclave) of the network.

[27] There are also other aspects related to the welfare magnet discussion beyond the mere observation that newly arriving immigrants will choose the country with the largest benefits: e.g., generous welfare systems might attract migrants who would not have migrated otherwise or can keep migrants already living in generous welfare states from returning to their home countries (see *Borjas,* 1999a).

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3.4 Estimating location choice

In this chapter our aim is to test the explanatory power of each of these explanations for differences in the skill structure of migrants across countries. To do this we consider the location choice of individual k who intends to migrate to the EU 15.[28] The individual faces R alternative regions, each with choice-specific attributes X_{kr} (including the costs of migration). Using this information, she can compare her utility at different regions, with the utility of a specific region s given by:

$$u_{ks} = X_{ks}\beta + \varepsilon_{ks}$$

Individual k's (additively separable) utility of living in region s thus depends on a vector of choice-specific characteristics of this region, X_{ks} as well as a random utility component ε_{ks}, which can be thought of as capturing random heterogeneity in tastes (as in *Wall*, 2001), uncertainty concerning living and working conditions in s (see, e.g., *Burda*, 1995) or random draws from a distribution of mobility costs (as in *Burda,* 1993). The individual will choose to migrate to region s if $u_{ks} > u_{kr} \ \forall \ r \in R \neq s$.

The probability of individual k moving to region s can then be defined as

$\Pr(u_{ks} = \max[u_{k1}, u_{k2}, ..., u_{kR}])$. Since, however, we cannot observe the utility of the different regions directly but only the information $I_k = s$ if the individual chooses to migrate to region s, we assume that this region provides the individual with the highest utility. Under the assumptions that the errors follow a type I extreme value (Gumbel) distribution, the probability of choosing a particular region $\Pr(I_k = s)$ can then be estimated by a conditional logit model (*McFadden*, 1973):[29]

$$\Pr(I_k = s|X_k) = \frac{\exp(X_{ks}\beta)}{\sum_{r=1}^{R} \exp(X_{kr}\beta)}$$

Data and explanatory variables

The data we use to estimate this function are taken from the 2007 EU Labour Force Survey (see last chapter for a description). These data allow us to model the individual locational choice between 160 NUTS-2 regions[30] of approximately 10 Mio. migrants from 183 source countries who moved to or within the EU 15 during the 1998-2007 period.[31] Our choice of

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[28] We abstain from modeling the choice of migrating or staying, and assume that the individual has already decided to migrate. Other studies analyzing intra-national location (see, for example, *Davies – Greenwood – Li,* 2001) incorporated the migration decision by also including the source region into the choice set. In our application, this would imply including all source countries (and their respective attributes) into the choice set of all individuals. Since not all of the information is available for all source countries, the possibility of staying in the home country in is not modeled in the analysis.

[29] See also *Bartel* (1989), *Bauer – Epstein – Gang* (2000, 2002, 2005), *Gottlieb – Joseph* (2006), *Jaeger* (2007) or *Christiadi – Cushing* (2008) for related applications of the conditional logit model.

[30] Since we focus on country of birth as our identifier for ethnicity, Germany and Ireland are not included. Due to data restrictions, Denmark is considered as a single NUTS-2 region and Åland (Finland) as well as Highlands and Islands (U.K.) are not considered. Extraterritorial and overseas territories are also not considered.

[31] As the data effectively constitute stock data, only those migrants who moved to or within the EU 15 and were still living there in 2007 can be considered. It is, however, not possible to control for repeat or return migration in our data.

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explanatory variables follows the discussion in the previous sections and other studies on the topic (see, e.g., *Bartel,* 1989, or *Davies – Greenwood – Li,* 2001). In addition to region specific variables, we also include host country specific variables as well as country-pair specific variables into our regression, since some important determinants of locational choice (e.g., tax levels, etc.) do not vary within countries. Variables specific to the source countries (such as unemployment or wage levels, or sending country fixed effects) cannot be considered in the conditional logit model, since variables with the same value for all R choices cancel out in the estimating equation. The same holds true for individual characteristics like age or gender. We will, however, interact all of the variables with dummy variables for educational attainment[32] to capture differences in the effects by education and in order to identify the specific determinants driving the location decisions of highly-skilled workers.

Region specific variables

Among the region specific X_k attributes assumed to influence the probability of moving to a region is the area (measured in 1,000 km²) since even if there is a completely uniform distribution of migrants across all regions, larger regions are more likely to attract larger inflows of migrants. A similar argument can be made for the population (in 100,000). After controlling for region size (area), regions with a higher population share should also attract a higher share of migrants. To control for differences in economic opportunities, we include the unemployment rate (in percent) as well as the average annual income per employed person (in €1,000). Data for population and unemployment (in 2006) as well as average annual income per employed person (in 2004) are taken from Eurostat. To proxy for the costs of migration (or the costs of visiting relatives at home), the distance (in 1,000 km, measured as "crow fly" distance) between the capital of the migrants' home country and the largest city within the region and its squared value are also included. We also include a dummy variable for regions which comprise national capitals, since these can be expected to receive a ceteris paribus higher share of migrants on account of being the cultural, political and administrative centers of the respective countries. We expect a negative effect of the unemployment rate and a positive effect of average annual income on the probability of choosing a specific region. For distance, a negative (but possible decreasing) effect can be expected.

Also a high degree of over-qualification, especially among highly skilled workers, may decrease the attractiveness of a specific host region. We thus include the percentage of highly skilled foreigners performing over-qualified work[33] among all highly skilled foreigners employed in the region into the regression. The over-qualification rate among highly skilled foreigners can be as high as 88.4%, on average, 32.7% of all highly skilled foreigners are employed in a job whose skill requirements are lower than their formal level of education (see table 3.1). For this variable, a negative effect can be expected: the larger the degree of

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[32] Low-skilled: ISCED 0-2, medium-skilled: ISCED 3-4, high-skilled: ISCED 5-6.

[33] See chapter 4 for the definition of our measure of over-qualification.

brain waste, the lower the attractiveness of a region. Furthermore, we expect this variable to have a stronger effect on highly skilled migrants, especially if the over-qualification rate among high-skilled is considered.

Table 3.1: Summary statistics for independent variables

	Observa-tions	Mean	S. D.	Min.	Max.
Region specific variables					
Area (in 1,000 km²)	160	17.18	23.66	0.16	165.30
Population (in 100,000)	160	1.54	1.45	0.11	9.03
Unemployment rate (in %)	160	7.30	3.75	2.29	20.19
Average annual income per employed person (in € 1,000)	160	27.13	10.34	10.57	95.98
Over-qualified highly skilled foreigners (in %)*	160	32.74	17.04	2.31	88.45
Network_js*	160	0.62	0.84	0.02	4.90
Country-pair specific variables					
Common border	2,379	0.02	0.13	0	1
Common official language	2,379	0.08	0.28	0	1
Colonial history	2,379	0.06	0.24	0	1
Colonial history (after 1945)	2,379	0.04	0.19	0	1
Host country specific variables					
Avg. combined tax and SSC rates (at avg. Income)	13	31.58	7.91	20.54	46.94
NIR(1, 1.33)	13	95.16	2.50	91.23	100.00
Net replacement rate (unemployment, in %)	13	60.46	14.88	36.00	87.00
Net replacement rate (pensions, in %)	13	77.87	18.63	41.10	110.10
Sickness/health care expenditures (€ per capita)	13	2.10	0.69	1.01	3.55
PISA 2006 science scores	13	501.08	24.91	473.00	563.00
MIPEX - labor market access	13	66.15	21.03	40.00	100.00

Source: European Labor Force Survey, CEPII, OECD, Eurostat, British Council, WIFO-calculations. – * Unweighted regional average over all ethnic groups. S. D. = standard duration.

Our most important regional specific variable is, however, the ethnic network and its skill composition. To measure the influence of network size on the probability of migration to a specific region after controlling for other factors affecting locational choice we include the proportion of migrants born in the same country of origin living in this region for 10 years or longer. For a migrant in ethnic group j, the network size in region s is defined as

$$\text{Network}_{js} = \frac{m_{js}^{10+}}{\sum_{r=1}^{R} m_{jr}^{10+}}$$

where m_{jr}^{10+} is the number of migrants of ethnic group j living in region r for more than 10 years. But the effect of a network in a specific region may not necessarily be limited to this region's borders. For example ethnic goods (like media or religious services) can also be consumed by individuals living in neighboring regions. Or migrants could live in one region but then commute to a neighboring region, where networks will help them find employment. The

individual may therefore not only be concerned with networks in his intended target region, but also with networks in neighboring regions.

We therefore also include the sum of the network of migrants from group j in neighboring regions as an additional variable in the regression:

$$\text{Network}_{js}^{N_1} = \frac{\sum_{l_1^s=1}^{L_1^s} m_{jsl_1^s}^{10+}}{\sum_{r=1}^{R} m_{jr}^{10+}}$$

with L_1^s being the set of regions sharing a border with region s. Furthermore, we also include the sum of the networks in second neighbor regions L_2^s (the neighbors of the L_1^s regions, except s) as an additional regressor in our model:

$$\text{Network}_{js}^{N_2} = \frac{\sum_{l_2^s=1}^{L_2^s} m_{jsl_2^s}^{10+}}{\sum_{r=1}^{R} m_{jr}^{10+}}$$

By including these variables, we incorporate spatial effects of ethnic networks in our model. We can, however, not model spatial dependence (i.e., spatial lags or spatial errors, see *Anselin*, 2006), because there are no estimators allowing spatial dependence in models of this kind. Furthermore, it can be assumed that it takes some time until ethnic goods will be provided within a network, another argument why spatially lagged values of the dependent variable are not considered. We thus focus on the spatially lagged network of migrants who moved to the region more than 10 years ago (which is exogenous in the regression), and not on spatially lagged contemporaneous networks.

To capture the effects of the skill composition of the regional networks we differentiate all of these network measures by skill levels. Following the discussion in section 3.3, we expect the network of highly skilled individuals to have a positive impact on the locational choice of migrants of all skill levels, and the network of low-skilled to have a neutral (or even negative) effect on location choices of medium or high skilled migrants. If, however, mostly low-skill migrants are employed in the production of ethnic goods (like food, clothing, etc.), the size of the low-skilled network can also have a positive impact on medium or high skilled migrants' locational choice.

Country-pair specific variables

Among the country-pair specific X_k attributes measured at the national level we include a dummy variable for linguistic closeness from CEPII which measures whether a migrant's home and host country share an official language (1, zero otherwise).[34] According to the CEPII data, 8.3% of all country pairs share a common official language, and a positive effect of this variable can be expected. We also include a neighborship dummy which is 1 if the host and home countries share a common border, and zero otherwise. Again, we expect a positive

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[34] As an alternative, CEPII also provides a dummy variable which captures whether at least 9% of the population in both countries speak the same language. As this variable can, however, be influenced by migration into the host country we will only use the official language dummy.

effect, e.g., because a common border facilitates not only legal, but also illegal immigration and can thus lead to ceteris paribus higher migration.

As mentioned in section 3.2, colonial ties can also have a positive effect on the locational choice of migrants. Data on colonial relationships are again taken from CEPII.[35] According to the data, 5.8% of the country pairs were in a colonial relationship at some point in the past. However, as this general measure of colonization is rather broadly defined[36] we include a dummy variable capturing whether two countries were in a colonial relationship after 1945 from the CEPII data (=1, zero otherwise), which reduces the percentage of country pairs in colonial relationship to 3.7%.

Host country specific variables

The host country specific X_k variables are intended to capture the effects of the tax or social security systems on locational choice of migrants. To capture the effects of the taxation system, the average personal income tax and employee social security contribution (SSC) as a percentage of gross wage earnings measured at the average income are included from the OECD Tax Database (2007 figures). As the progressivity of the tax system can affect the skill composition of migrants (see *Egger – Radulescu,* 2008), we also include the net income ratio as a measure for the progressivity of the tax system. Defining $t(\cdot)$ as the function of the combined tax and SSC rates and $\bar{y}$ as average income, the net income ratio at 133% and 100% of the average wage is defined as (see *Schratzenstaller – Wagener,* 2009):

$$\text{NIR}(1,1.33) = \frac{1 - t(1.33\bar{y})}{1 - t(\bar{y})} * 100$$

where values NIR < 1 indicate a progressive tax system, and progression is higher the lower the net income ratio. As table 3.1 shows, the average combined tax and SSC rates evaluated at the average income range from 20.5% (Spain) to 46.9% (Luxemburg) in the 13 EU-countries considered according to the OECD data, with an average rate of 31.6%. The value for Austria is slightly above average (33.6%) and thereby the 5th highest value among all 13 EU-countries. As the summary statistics for the net income ratios shows, mostcountries apply progressive tax schedules (at least in the 100% to 133% income range). According to the net income ratio criterion, the countries with the lowest progressivity in their tax code are Luxembourg, whose tax code is not progressive between 100% and 133% of income (NIR = 100.0) and the U.K. (NIR = 98.5), while Denmark (NIR = 91.2) and Sweden (NIR = 91.7) are the most progressive when comparing the net income rates at 100% and 133% of the average income. The Austrian net income rate is NIR = 94.4, the 5th highest value in the EU 13 considered. We expect the attractiveness of a region/country to decrease with the average tax and SSC

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[35] In the notes to the data, *Mayer – Zigagno* (2006, p.4) define "colonization" as a term "[…] that we use to describe a relationship between two countries, independently of their level of development, in which one has governed the other over a long period of time and contributed to the current state of its institutions."

[36] For example Austria and the successor states of the former Habsburg empire are coded as having been in a colonial relationship, as are the USA and the United Kingdom.

rate. Furthermore, we expect the progressivity of the tax system to have a stronger negative effect on migration of the highly skilled.

To test for welfare magnet effects in the EU-countries considered, we include various proxies for the generosity of the social security system. The first variable is the net replacement rate during the initial phase of unemployment (following any waiting period) at the average wage for single individuals without kids for 2007 from the OECD Benefits and Wages Statistics.[37] Although many migrants are not eligible for unemployment benefits right after arriving in the host country, a positive effect of the net replacement rate can be expected if migrants expect to become (temporarily) unemployed at some point in the future. The same holds true for the pension net replacement rate (for men, at average wage) published in OECD (2007). The unemployment and pension replacement rates differ widely across the EU-countries considered, with levels ranging from 36% to 87% (unemployment benefits) and 41.1% to 110.1% (pensions), respectively. Austria's unemployment net replacement rate is with 55% slightly below average, while its pension replacement rate (90.9%) is markedly above average. As objective measures on the quality of the health care system are not available, we use the sickness/health care expenditures per capita in Euro (2005 Eurostat data) to proxy for the quality of health services. According to the data, Austria's sickness/health care expenditures of about 2,100 € per capita and year are about average. To control for the quality of the educational system, which might play a role especially for highly skilled migrants, the 2006 PISA science scores (*OECD*, 2007) are also included (see *Geis – Uebelmesser – Werding,* 2008). Among the countries considered, Austria has the 4th highest PISA science score (511), excelled only by the U.K. (515), the Netherlands (525) and Finland (563). It can be expected that highly skilled migrants generally place a lower value on welfare generosity, but a higher value on the quality of the educational system.

The tax and welfare systems can be seen as two sides of the same coin. This is also reflected by the fact that, e.g., the average combined tax and SSC rates and the sickness/health expenditures per capita are highly (and significantly) correlated across the 13 EU-countries considered (correlation coefficient $\rho = 0.723$). Because of this high correlation, the welfare and tax variables will not enter the same regressions. Instead, separate regressions are estimated, looking at the provision of public services from two sides – financing and expenditures.

Finally, we also include data from the British Council's Migrant Integration Policy Index (MIPEX II) project which provides indices for the strictness of integration policies. We include the index measuring the labor market access dimension ranging from 0 to 100, with 0 representing "critically unfavorable" circumstances and 100 representing "best practice" (see *Niessen – Huddleston – Citron,* 2007).[38] The country with the highest value (and the only country to

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[37] http://www.oecd.org/document/29/0,3343,en_2649_34637_39618653_1_1_1_1,00.html, accessed January 19, 2010.

[38] The index covers the following dimensions: eligibility ("Are migrants excluded from taking some jobs?"), labor market integration measures ("What is the state doing to help migrants adjust to the demands of the labor market?"), security

achieve a "best practice" rating of 100) is Sweden, the countries with the lowest ratings are Denmark and Greece (40 points), followed by Austria and Luxembourg (45 points). It can be hypothesized that a larger value of this index increases the attractiveness of a country as target location, so that a positive coefficient can be expected.

3.5 Empirical analysis

General estimation

Table 3.2 shows the results of four specifications of the conditional logit model. Because the coefficients of the conditional logit regression (which give the changes in log-odds) are rather difficult to interpret, we report the exponentiated coefficients, or odds ratios. The odds ratios show the change in the odds of choosing a specific region vs. choosing a different region for an increase of a continuous independent variable by one unit or the change of a dummy variable from zero to one. The odds are defined as the probability of choosing a region divided by the probability of not choosing this region. For instance odds of 3 imply that the probability of an individual choosing a region is three times as high as the probability of not choosing this region (or, expressed differently, the probability of choosing a region is 3 to 1, or 75% to 25%). The odds ratio is the ratio between two odds evaluated at different values of an independent variable. E.g., if the odds of choosing a region are 4 to 1 if it is a capital region, but only 2 to 1 if it is not a capital region, the odds ratio of 4/2 = 2 implies that the odds of choosing a region are twice as high if it is a capital region.[39] An odds ratio larger than one thus indicates an increase in the odds, an odds ratio smaller than one a decrease in the odds of choosing a region.

Because all variables were interacted with the individual's educational level, we report separate odds ratios for low-, medium- and high-skilled workers based on the coefficients of the independent variables and the interactions of these regressors with dummy variables for medium- or high-skilled individuals. Column (1) presents a parsimonious basic specification, including only some region specific and country-pair specific variables. As can be seen from column (2), including the network variables significantly improves the fit of the model measured by the pseudo-R^2. The specifications in columns (3) and (4) extend the regression by the tax and welfare variables, respectively. Overall, inclusion of the tax or welfare variables increases the model fit only marginally. As stated in the previous section, sending country fixed effects cannot be estimated in the conditional logit model.

The results of the basic specification indicate that (especially highly skilled) individuals prefer larger regions, both in terms of population as well as in terms of the area. For the low and

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of employment ("Can migrants easily lose their work permit?") and rights associated ("What rights do migrants have as workers?").

[39] The odds ratio for a change in any variable x is defined as:

$$\frac{\Pr(I_k = s \,|x + 1)/(1 - \Pr(I_k = s \,|x + 1))}{\Pr(I_k = s \,|x)/(1 - \Pr(I_k = s \,|x))}$$

medium skilled, the effect of area is, however, not positive in all specifications. The attractiveness of a region decreases (at an increasing rate, as the odds ratio < 1 of the squared distance shows) with distance to the source country in the basic specification. In specifications (2) to (4), distance also has a negative effect on locational choice of the low and medium skilled (odds ratios < 1), the effect is however decreasing in distance (odds ratios of squared distance > 1). For highly skilled individuals, a positive (but decreasing) effect can be estimated in specifications (2) and (4). The effect of distance is thus not very robust. The effect of the average annual income per employed person is, however, unequivocally positive, while the unemployment rate has a significantly negative effect on choosing a region, especially for individuals with medium skills (ISCED 3-4). Capital regions attract mainly highly skilled individuals, whose odds of moving to a country's capital are between 35.6% and 54.6% higher, all else equal. Surprisingly, the over-qualification rate of highly skilled individuals has positive odds ratios throughout, even for the high skilled. Endogeneity of the regressor may explain this result, since over-qualification of foreigners will be higher in regions with a higher number of highly skilled migrants. Thus, the more individuals choose a region, the higher the degree of over-qualification.

Ethnic networks in the same region show significantly and consistently positive effects on choosing a region. But as can also be seen from columns (2) to (4) in table 3.2, migrants are mainly attracted by ethnic networks of individuals with the same skill levels. That is an increase in the ethnic network of low skilled migrants increases the attractiveness of this region for other low skilled migrants from the same country of origin. It also increases the attractiveness of the region for medium and high skilled migrants with the same ethnicity, but at a lower rate. This indicates that an increase in the local ethnic network increases the probability of individuals from the same country of origin moving to this region, irrespective of their skill level. The externality is, however, largest for individuals within the same skill group. The same holds true for ethnic networks of medium and high skilled individuals.

Table 3.2: Conditional logit regression, all source countries

	(1) Low	(1) Medium	(1) High	(2) Low	(2) Medium	(2) High	(3) Low	(3) Medium	(3) High	(4) Low	(4) Medium	(4) High
Area (1,000 km²)	**1.001** (0.000)	0.998 (0.000)	**1.003** (0.000)	0.999 (0.000)	0.996 (0.000)	1.003 (0.000)	0.997 (0.000)	0.999 (0.000)	**1.003** (0.000)	0.996 (0.000)	0.996 (0.000)	**1.001** (0.000)
Population (1,000)	**1.440** (0.000)	**1.378** (0.000)	**1.356** (0.000)	**1.350** (0.000)	**1.332** (0.000)	**1.306** (0.000)	**1.326** (0.000)	**1.316** (0.000)	**1.295** (0.000)	**1.363** (0.000)	**1.408** (0.000)	**1.349** (0.000)
Distance (1,000 km)	0.529 (0.001)	0.728 (0.003)	0.888 (0.004)	0.469 (0.001)	0.877 (0.004)	**1.145** (0.007)	0.445 (0.001)	0.545 (0.003)	0.972 (0.006)	0.473 (0.001)	0.676 (0.003)	1.059 (0.006)
Distance² (1,000 km)	0.984 (0.000)	0.981 (0.000)	0.973 (0.000)	1.029 (0.000)	**1.001** (0.000)	0.981 (0.000)	**1.032** (0.000)	**1.031** (0.000)	0.990 (0.000)	**1.028** (0.000)	**1.014** (0.000)	0.985 (0.006)
Avg. income p.a. and employed person (1,000 €)	**1.014** (0.000)	**1.028** (0.000)	**1.031** (0.000)	**1.010** (0.000)	**1.022** (0.000)	**1.021** (0.000)	**1.014** (0.000)	**1.018** (0.000)	**1.021** (0.000)	**1.021** (0.000)	**1.020** (0.000)	**1.021** (0.000)
Unemployment rate (%)	0.978 (0.000)	0.941 (0.000)	0.975 (0.000)	0.996 (0.000)	0.951 (0.000)	0.979 (0.000)	0.997 (0.000)	0.957 (0.000)	0.979 (0.000)	0.990 (0.000)	0.954 (0.000)	0.982 (0.000)
Capital (=1)	**1.417** (0.002)	**1.175** (0.002)	**1.546** (0.003)	0.811 (0.002)	0.793 (0.003)	**1.376** (0.005)	0.889 (0.002)	**1.010** (0.003)	**1.509** (0.006)	0.750 (0.002)	0.889 (0.004)	**1.356** (0.006)
Over-qualification rate of highly skilled (%)	**1.033** (0.000)	**1.030** (0.000)	**1.025** (0.000)	**1.023** (0.000)	**1.021** (0.000)	**1.019** (0.000)	**1.016** (0.000)	**1.013** (0.000)	**1.014** (0.000)	**1.010** (0.000)	**1.011** (0.000)	**1.015** (0.000)
Network of low skilled (%)				**1.057** (0.000)	**1.038** (0.000)	**1.021** (0.000)	**1.056** (0.000)	**1.041** (0.000)	**1.022** (0.000)	**1.056** (0.000)	**1.042** (0.000)	**1.022** (0.000)
Network of medium skilled (%)				**1.031** (0.000)	**1.041** (0.000)	**1.031** (0.000)c	**1.027** (0.000)	**1.034** (0.000)	**1.027** (0.000)c	**1.026** (0.000)	**1.030** (0.000)	**1.026** (0.000)c
Network of high skilled (%)				**1.011** (0.000)	**1.015** (0.000)	**1.031** (0.000)	**1.014** (0.000)	**1.019** (0.000)	**1.032** (0.000)	**1.014** (0.000)	**1.018** (0.000)	**1.032** (0.000)
Network of low skilled, 1st neighbors (%)				**1.031** (0.000)	**1.014** (0.000)	**1.010** (0.000)	**1.033** (0.000)	**1.017** (0.000)	**1.012** (0.000)	**1.035** (0.000)	**1.022** (0.000)	**1.013** (0.000)
Network of medium skilled, 1st neighbors (%)				0.999 (0.000)	**1.009** (0.000)	**1.001** (0.000)	0.996 (0.000)	**1.004** (0.000)	0.998 (0.000)	0.996 (0.000)	**1.003** (0.000)	0.997 (0.000)
Network of high skilled, 1st neighbors (%)				**1.010** (0.000)	**1.015** (0.000)	**1.019** (0.000)	**1.011** (0.000)	**1.016** (0.000)	**1.020** (0.000)	**1.012** (0.000)	**1.018** (0.000)	**1.021** (0.000)
Network of low skilled, 2nd neighbors (%)				**1.031** (0.000)	**1.014** (0.000)	**1.002** (0.000)	**1.030** (0.000)	**1.015** (0.000)	**1.002** (0.000)	**1.031** (0.000)	**1.018** (0.000)	**1.003** (0.000)
Network of medium skilled, 2nd neighbors (%)				0.998 (0.000)	**1.007** (0.000)	**1.010** (0.000)	0.997 (0.000)	**1.004** (0.000)	**1.008** (0.000)	0.997 (0.000)	**1.005** (0.000)	**1.008** (0.000)
Network of high skilled, 2nd neighbors (%)				0.993 (0.000)	0.994 (0.000)	**1.005** (0.000)	0.993 (0.000)	0.993 (0.000)	**1.004** (0.000)	0.995 (0.000)	0.996 (0.000)	**1.006** (0.000)

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Table 3.2: cont'd

	(1) Low	(1) Medium	(1) High	(2) Low	(2) Medium	(2) High	(3) Low	(3) Medium	(3) High	(4) Low	(4) Medium	(4) High
						Skilled						
Common official language (=1)				**3.873**	**6.425**	**5.698**	**3.636**	**5.704**	**5.298**	**3.191**	**4.813**	**5.154**
				(0.009)	(0.005)	(0.005)	(0.009)	(0.005)	(0.005)	(0.008)	(0.005)	(0.006)
Common border (=1)				0.670	0.870	0.916	**1.237**	**1.350**	**1.058**	0.980	**1.047**	0.966
				(0.002)	(0.006)	(0.007)	(0.004)	(0.005)	(0.004)	(0.003)	(0.005)	(0.005)
Colonial relationship after 1945 (=1)				0.244	0.530	0.995	0.342	0.503	**1.074**	0.442	0.615	**1.199**
				(0.001)	(0.010)	(0.023)	(0.001)	(0.007)	(0.018)	(0.002)	(0.007)	(0.016)
MIPEX Labor Market Acces Index							**1.022**	**1.016**	**1.010**	**1.019**	**1.015**	**1.012**
							(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Avg. combined tax and SSC rate at avg. Income (%)							0.990	0.972	0.983			
							(0.000)	(0.000)	(0.000)			
NIR[1,1.33]							**1.092**	**1.269**	**1.050**			
							(0.001)	(0.001)	(0.001)			
Unemployment net replacement rate at avg. Income (%)										0.991	0.973	0.991
										(0.000)	(0.000)	(0.000)
Pension net replacement rate at avg. Income (%)										1.000	0.991	**1.005**
										(0.000)	(0.000)	(0.000)
Sickness/healthcare expenditures p.a. and per capita (1,000 €)										0.445	0.415	0.906
										(0.001)	(0.004)	(0.009)
PISA science score										**1.010**	**1.015**	**1.008**
										(0.000)	(0.000)	(0.000)
Observations	10,135,231			10,135,231			10,135,231			10,135,231		
Pseudo-R²	0.128			0.229			0.238			0.238		

Sources: European Labor Force Survey, CEPII, OECD, Eurostat, British Council, WIFO-calculations. – Odds ratios reported. Bold figures indicate odds ratios ≥1. Standard errors in parentheses. Number of observations refers to number of individuals for which choice is modeled. All variables and interactions are statistically significant at the 1% level, except [a] significant at the 10% level (significantly different from "Low skill" value at 10% level for interactions), [b] significant at the 5% level (significantly different from "Low skill" value at 5% level for interactions), [c] not significant (not significantly different from "Low skill" value for interactions). "Medium skill" and "High skill" columns report product of the base ("Low skill") odds ratio and the odds ratio of the respective variable's interaction term.

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The effects of networks in neighboring regions are – as expected – noticeably smaller, but basically show the same pattern as the effects of networks in the region of residence. Although some odds ratios smaller than one indicate that larger networks in neighboring regions and second neighboring regions exercise a negative effect on choosing a region, these negative effects are small at best and decreases the odds of moving to a region by 0.7% at most. For individuals within the same skill group, the effects are unequivocally positive. Thus, an increase in the size of the same-skill ethnic network also increases the attractiveness of adjacent (or second neighbor) regions.

The probability of choosing a region increase considerably if the host and home countries share an official language. This effect is especially pronounced for medium and high skilled individuals, for which the odds of moving to a region increase by a factor of 4.8 to 6.4 if the two countries have a common official language. One reason for this finding might be that specialized occupations where highly skilled migrants work require a solid knowledge of the host country's language. Highly qualified migrants therefore benefit more from common languages than low skilled migrants.

The effects of common borders and colonial relationships are less robust and vary considerably across specifications, although for the latter variable a positive effect can be found for highly skilled individuals in specifications (3) and (4): for highly skilled migrants the odds of moving to a region increase by 7.4% or 19.9%, respectively, if the target region is in a country with which the host country had a colonial relationship after 1945. Individuals with skills below ISCED 5 or 6, however, show strong disincentives to move to such a region. A higher score of the MIPEX II Labour Market Access Index increases the probability of moving to a region: countries with more liberal rules concerning migrant's access to the labor market as well as to active labor market policies thus attract a – ceteris paribus – higher share of migrants. The effect is, however, noticeably stronger for low-skill migrants, albeit not negative for highly skilled migrants.

As hypothesized, the specification including the tax variables in column (3) shows that the attractiveness of a region decreases with the average combined tax and SSC rates. Furthermore, the effect is larger (in absolute terms) for medium and highly skilled migrants: all else equal, a 1 percentage point increase in the average combined tax and social security contribution rates (at the average income) decreases the odds of moving to a region by 1.0% for low skilled, by 2.8% for medium skilled and by 1.7% for high skilled migrants. Furthermore, the less progressive the tax code, the more attractive a region, as shown by the positive coefficient for the net income ratio. Especially medium skilled migrants prefer countries with a lower degree of progressivity in their taxation system: a 1 percentage point increase in the relative net income (when moving from 100% to 133% of average income) increases the odds of moving to a region by 26.9% for medium skilled migrants, but only by 9.2% for low skilled and 5.0% for high skilled individuals. The reason for this finding may be that medium skilled workers are most likely to work at the average income where they face the given level of progressivity. High skilled individuals, on the other hand, are more likely to earn

an above average wage where the average tax rate is higher but the rate of progressivity is lower. Low skill individuals, finally, are likely to earn below average wages where tax rates are lower, and might thus care less about progressivity even if the degree of progressivity is, on average, highest between 67% and 100% of the average wage.

The results of the model including the welfare system variables in column (4) are rather unexpected, except for the effects of the PISA science scores used to capture the quality of the educational system, which increase the odds of moving to a region by 0.8 to 1.5% which is a quite sizeable effect considering the range of PISA scores in table 3.1. The effect is, however, larger for medium and low-skilled migrants, which might indicate that highly skilled migrants place a larger weight on the quality of institutions of tertiary education and not so much on the quality of the schooling system.

For most of the other welfare variables we find a negative effect on locational choice, which is not unprecedented in the literature (see *Pedersen – Pytlikova – Smith,* 2008 or *Geis – Uebelmesser – Werding,* 2008). Both a higher unemployment replacement rate as well as higher health expenditures decrease the attractiveness of a region, the pension replacement rate affects only the locational choice of high skilled migrants positively. This might indicate that the variables used do not really reflect the generosity of the welfare system, but other characteristics of the target country. In particular, higher health care expenditures might indicate an ageing society, or poor environmental conditions. Another explanation might be that taxes are higher in more generous welfare systems, and individuals expect to pay higher taxes and social security contributions to finance higher welfare expenditures. If the individual's willingness to pay for an increase in welfare provision (the implicit increase in taxation they are willing to bear, for instance for an increase in the unemployment replacement rate) is lower than its implicit tax price, the attractiveness of a region or country will be lower although it provides superior welfare (see also *Geis – Uebelmesser – Werding,* 2008). Furthermore, if migrants are not eligible for social security benefits right away, the negative effect of the implicit taxes will be amplified in a more generous welfare system, because newcomers will have to pay higher taxes for welfare benefits they are not entitled to. This disincentive seems to dominate any positive effect based on expectations of future welfare benefits.

What can be concluded from this discussion is that there is obviously no strong evidence for the welfare magnet hypothesis in the data, and that the location decisions of migrants in the 13 EU-countries considered are governed by income opportunities, labor market conditions (unemployment, access to labor market), networks, a common language as well as the design of the tax system, but not by the generosity of the welfare state.

Robustness

Because the results of the regression in table 3.2 including all source countries might be distorted by the fact that both migrants as well as refugees (who will probably place different weights on some of the variables considered) are included, the regression was repeated for

individuals from countries with a Human Development Index of 0.75 (2009 values, based on statistical values for 2007, see *UNDP,* 2009) or above (table 3.3) as well as for intra-EU 15 migrants, respectively (table 3.4).[40]

The main conclusions from the above discussion remain intact, even if the model is estimated for a subset of the sample only (migrants from countries with a Human Development Index equal to or exceeding 0.75, see table 3.3). Again it is mostly income opportunities and labor market conditions, networks, a common language as well as the tax system which determine location choice.

Considering only intra-EU 15 migration, the regression (table 3.4) shows that the system of taxation does play an important role for migrants between the EU 15-countries: as in the general case (table 3.3), a 1 percentage point increase in the average combined income tax and social security contribution rate decreases the odds of moving to a region by 3.6% (medium skilled migrants) to 0.5% (low skilled migrants). The attractiveness of a region decreases also with the progressivity of the tax system, which affects all migrants irrespectively of their skill level. The effect of networks on intra-EU 15 migration also follows basically the same pattern as in tables 3.2 and 3.3: the effect of same-skill ethnic networks is—as before— larger than the effect of ethnic networks with different skill levels. However, the size of the local network of medium and high skilled migrants has a negative effect for low-skill migrants and decreases their odds of choosing a region by 1.8% to 4.2%, depending on specification.

Again, a common official language increases the probability of choosing a region, especially for highly skilled migrants. As can be expected, the labor market access index plays only a minor role for intra-EU 15 migrants because EU nationals are treated equally to natives concerning labor market access in all EU member states because of the freedom of movement which ensures the abolition of any discrimination based on nationality between workers of the EU member states. The variable is even negative for low and medium skilled migrants, probably because they can expect a higher competition for jobs if access to the labor market is easier for migrants from non-EU-countries. Concerning the welfare generosity variables, there is some indication that low-skill migrants are attracted by regions/countries with larger unemployment replacement rates. As before, the effects of healthcare expenditures and pension replacement rates are, however, negative. Generally, it can be concluded that income opportunities, same-skill ethnic networks, a common official language as well as low taxes and a low degree of progressivity increase the attractiveness of a region.

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[40] The dummy variable capturing colonial relationships between two countries after 1945 is zero for all pairs within the EU 15 and thus excluded from the intra-EU regression.

Table 3.3: Conditional logit regression, only source countries with HDI ≥ 0.75

	(1) Low	(1) Medium	(1) High	(2) Low	(2) Medium	(2) High	(3) Low	(3) Medium	(3) High	(4) Low	(4) Medium	(4) High
Area (1.000 km²)	**1.003** (0.000)	0.999 (0.000)	**1.005** (0.000)	**1.000** (0.000)	0.997 (0.000)	**1.004** (0.000)	**1.000** (0.000)	**1.000** (0.000)b	**1.003** (0.000)	1.000 (0.000)	0.997 (0.000)	**1.002** (0.000)
Population (1.000)	**1.417** (0.000)	**1.373** (0.000)	**1.341** (0.000)	**1.323** (0.000)	**1.323** (0.000)c	**1.295** (0.000)	**1.297** (0.000)	**1.299** (0.000)b	**1.285** (0.000)	**1.314** (0.000)	**1.387** (0.000)	**1.329** (0.001)
Distance (1.000 km)	0.590 (0.001)	0.724 (0.003)	0.832 (0.004)	0.647 (0.001)	**1.012** (0.004)	**1.236** (0.006)	0.542 (0.001)	0.582 (0.003)	**1.048** (0.006)	0.598 (0.001)	0.781 (0.004)	**1.168** (0.006)
Distance² (1.000 km)	0.976 (0.000)	0.971 (0.000)	0.968 (0.000)	1.011 (0.000)	0.987 (0.000)	0.972 (0.000)	1.022 (0.000)	1.021 (0.000)	0.981 (0.000)	1.017 (0.000)	1.001 (0.000)	0.976 (0.000)
Avg. income p.a. and employed person (1.000 €)	**1.011** (0.000)	**1.022** (0.000)	**1.028** (0.000)	**1.008** (0.000)	**1.022** (0.000)	**1.025** (0.000)	**1.012** (0.000)	**1.019** (0.000)	**1.025** (0.000)	**1.022** (0.000)	**1.020** (0.000)	**1.028** (0.000)
Unemployment rate (%)	0.982 (0.000)	0.942 (0.000)	0.982 (0.000)	0.995 (0.000)	0.949 (0.000)	0.981 (0.000)	0.998 (0.000)	0.953 (0.000)	0.981 (0.000)	0.988 (0.000)	0.950 (0.000)	0.980 (0.000)
Capital (=1)	**1.670** (0.003)	**1.434** (0.002)	**1.868** (0.003)	0.794 (0.002)	0.806 (0.003)	**1.344** (0.006)	0.871 (0.002)	**1.042** (0.004)	**1.458** (0.006)	0.707 (0.002)	0.911 (0.005)	**1.268** (0.007)
Over-qualification rate of highly skilled (%)	**1.032** (0.000)	**1.031** (0.000)	**1.028** (0.000)	**1.017** (0.000)	**1.020** (0.000)	**1.020** (0.000)	**1.012** (0.000)	**1.013** (0.000)a	**1.014** (0.000)	**1.004** (0.000)	**1.009** (0.000)	**1.013** (0.000)
Network of low skilled (%)				**1.059** (0.000)	**1.042** (0.000)	**1.020** (0.000)	**1.060** (0.000)	**1.046** (0.000)	**1.021** (0.000)	**1.058** (0.000)	**1.048** (0.000)	**1.021** (0.000)
Network of medium skilled (%)				**1.025** (0.000)	**1.040** (0.000)	**1.033** (0.000)	**1.023** (0.000)	**1.033** (0.000)	**1.029** (0.000)	**1.023** (0.000)	**1.029** (0.000)	**1.027** (0.000)
Network of high skilled (%)				**1.017** (0.000)	**1.016** (0.000)	**1.039** (0.000)	**1.022** (0.000)	**1.021** (0.000)	**1.041** (0.000)	**1.023** (0.000)	**1.020** (0.000)	**1.041** (0.000)
Network of low skilled, 1st neighbors (%)				**1.032** (0.000)	**1.007** (0.000)	0.993 (0.000)	**1.035** (0.000)	**1.012** (0.000)	0.995 (0.000)	**1.036** (0.000)	**1.017** (0.000)	0.997 (0.000)
Network of medium skilled, 1st neighbors (%)				0.989 (0.000)	**1.010** (0.000)	**1.010** (0.000)	0.986 (0.000)	**1.004** (0.000)	**1.007** (0.000)	0.986 (0.000)	**1.004** (0.000)	**1.007** (0.000)
Network of high skilled, 1st neighbors (%)				**1.016** (0.000)	**1.014** (0.000)	**1.022** (0.000)	**1.019** (0.000)	**1.016** (0.000)	**1.023** (0.000)	**1.021** (0.000)	**1.018** (0.000)	**1.025** (0.000)

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Table 3.3: Cont'd

	(1) Low skill	(1) Medium skill	(1) High skill	(2) Low skill	(2) Medium skill	(2) High skill	(3) Low skill	(3) Medium skill	(3) High skill
Network of low skilled, 2nd neighbors (%)	**1.033** (0.000)	**1.015** (0.000)	**1.000** (0.000)	**1.034** (0.000)	**1.017** (0.000)	**1.001** (0.000)	**1.035** (0.000)	**1.020** (0.000)	**1.001** (0.000)
Network of medium skilled, 2nd neighbors (%)	0.991 (0.000)	**1.006** (0.000)	**1.009** (0.000)	0.990 (0.000)	**1.002** (0.000)	**1.006** (0.000)	0.989 (0.000)	**1.003** (0.000)	**1.006** (0.000)
Network of high skilled, 2nd neighbors (%)	0.993 (0.000)	0.990 (0.000)	**1.009** (0.000)	0.994 (0.000)	0.989 (0.000)	**1.008** (0.000)	0.996 (0.000)	0.992 (0.000)	**1.011** (0.000)
Common official language (=1)	**4.870** (0.015)	**6.175** (0.005)	**4.687** (0.004)	**3.958** (0.013)	**5.229** (0.006)	**4.380** (0.005)	**3.761** (0.012)	**4.700** (0.005)	**4.345** (0.005)
Common border (=1)	0.860 (0.003)	0.980 (0.005)	**1.042** (0.006)	**1.256** (0.005)	**1.385** (0.005)	**1.167** (0.005)	**1.065** (0.004)	**1.122** (0.005)	**1.087** (0.005)
Colonial relationship after 1945 (=1)	0.422 (0.003)	**1.597** (0.035)	**3.215** (0.092)	0.546 (0.003)	**1.271** (0.021)	**3.388** (0.074)	0.584 (0.003)	**1.288** (0.019)	**3.427** (0.070)
MIPEX Labor Market Acces Index				**1.019** (0.000)	**1.014** (0.000)	**1.010** (0.000)	**1.015** (0.000)	**1.013** (0.000)	**1.011** (0.000)
Avg. combined tax and SSC rate at avg. Income (%)				0.999 (0.000)b	0.968 (0.000)	0.982 (0.000)			
NIR(1,1.33)				**1.073** (0.001)	**1.251** (0.001)	**1.028** (0.001)			
Unemployment net replacement rate at avg. Income (%)							0.993 (0.000)	0.974 (0.000)	0.993 (0.000)b
Pension net replacement rate at avg. Income (%)							**1.000** (0.000)c	0.991 (0.000)	**1.006** (0.000)
Sickness/healthcare expenditures p.a. and per capita (1,000 €)							0.485 (0.002)	0.433 (0.004)	0.862 (0.009)
PISA science score							**1.003** (0.000)	**1.012** (0.000)	**1.005** (0.000)
Observations	7724723		7724723			7724723			7724723
Pseudo-R²	0.129		0.221			0.228			0.229

Sources: European Labor Force Survey, CEPII, OECD, Eurostat, British Council, WIFO-calculations. – Odds ratios reported. Bold figures indicate odds ratios ≥1. Standard errors in parentheses. Number of observations refers to number of individuals for which choice is modeled. All variables and interactions are statistically significant at the 1% level, except a significant at the 10% level (significantly different from "Low skill" value at 10% level for interactions), b significant at the 5% level (significantly different from "Low skill" value at 5% level for interactions), c not significant (not significantly different from "Low skill" value for interactions). "Medium skill" and "High skill" columns report product of the base ("Low skill") odds ratio and the odds ratio of the respective variable's interaction term.

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Table 3.4: Conditional logit regression, migrants from EU 15-countries

	(1) skilled			(2) skilled			(3) skilled			(4) skilled		
	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Area (1,000 km²)	**1.006** (0.000)	**1.000** (0.000)	**1.007** (0.000)	**1.003** (0.000)	0.998 (0.000)	**1.006** (0.000)	**1.005** (0.000)	**1.000** (0.000)	**1.007** (0.000)	**1.005** (0.000)	0.999 (0.000)	**1.006** (0.000)
Population (1,000)	**1.284** (0.001)	**1.251** (0.001)	**1.281** (0.001)a	**1.147** (0.001)	**1.215** (0.002)	**1.257** (0.002)	**1.126** (0.001)	**1.182** (0.002)	**1.243** (0.002)	**1.096** (0.001)	**1.204** (0.002)	**1.263** (0.002)
Distance (1,000 km)	**1.010** (0.011)c	0.648 (0.009)	0.822 (0.010)	**1.586** (0.019)	**1.476** (0.014)	**1.590** (0.015)c	**1.624** (0.020)	**1.426** (0.014)	**1.546** (0.014)	**1.313** (0.015)	**1.565** (0.018)	**1.458** (0.016)
Distance² (1,000 km)	0.806 (0.003)	**1.014** (0.007)	**1.012** (0.006)	0.832 (0.003)	0.948 (0.006)	0.963 (0.006)	0.832 (0.003)	0.943 (0.006)	0.948 (0.006)	0.911 (0.004)	0.942 (0.005)	0.975 (0.005)
Avg. income p.a. and employed person (1,000 €)	**1.023** (0.000)	**1.029** (0.000)	**1.041** (0.000)	**1.027** (0.000)	**1.033** (0.000)	**1.043** (0.000)	**1.024** (0.000)	**1.029** (0.000)	**1.039** (0.000)	**1.034** (0.000)	**1.029** (0.000)	**1.048** (0.000)
Unemployment rate (%)	**1.053** (0.001)	0.967 (0.001)	0.996 (0.001)	**1.033** (0.001)	0.948 (0.001)	0.976 (0.001)	**1.040** (0.001)	0.948 (0.001)	0.979 (0.001)	**1.023** (0.001)	0.946 (0.001)	0.971 (0.001)
Capital (=1)	**1.388** (0.010)	0.886 (0.006)	**1.393** (0.009)c	0.966 (0.010)	0.629 (0.008)	0.902 (0.011)	**1.094** (0.011)	0.764 (0.009)	**1.103** (0.012)c	0.828 (0.009)	0.754 (0.013)	0.802 (0.013)a
Over-qualification rate of highly skilled (%)	**1.000** (0.000)a	**1.000** (0.000)	**1.013** (0.000)	**1.001** (0.000)	0.999 (0.000)	**1.010** (0.000)	**1.002** (0.000)	**1.000** (0.000)	**1.005** (0.000)	**1.011** (0.000)	**1.005** (0.000)	**1.003** (0.000)
Network of low skilled (%)				**1.145** (0.001)	**1.041** (0.001)	**1.042** (0.001)	**1.159** (0.001)	**1.066** (0.001)	**1.005** (0.001)	**1.148** (0.001)	**1.044** (0.001)	0.980 (0.001)
Network of medium skilled (%)				0.967 (0.001)	**1.061** (0.001)	**1.042** (0.001)	0.958 (0.001)	**1.042** (0.001)	**1.028** (0.001)	0.971 (0.001)	**1.062** (0.001)	**1.044** (0.001)
Network of high skilled (%)				0.981 (0.001)	**1.021** (0.002)	**1.128** (0.001)	0.982 (0.001)	**1.016** (0.001)	**1.113** (0.001)	0.978 (0.001)	**1.014** (0.002)	**1.127** (0.002)
Network of low skilled, 1st neighbors (%)				**1.048** (0.001)	0.963 (0.001)	0.976 (0.001)	**1.058** (0.001)	0.976 (0.001)	0.985 (0.001)	**1.036** (0.001)	0.969 (0.001)	0.974 (0.001)
Network of medium skilled, 1st neighbors (%)				0.970 (0.001)	**1.000** (0.001)	**1.015** (0.001)	0.964 (0.001)	0.996 (0.001)	**1.006** (0.001)	0.982 (0.001)	**1.001** (0.001)	**1.013** (0.001)
Network of high skilled, 1st neighbors (%)				**1.010** (0.001)	**1.073** (0.001)	**1.049** (0.001)	**1.005** (0.001)	**1.062** (0.001)	**1.042** (0.001)	**1.002** (0.001)a	**1.067** (0.001)	**1.054** (0.001)

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Table 3.4: Cont'd

	(1) Low	(1) Medium	(1) High	(2) Low	(2) Medium	(2) High	(3) Low	(3) Medium skilled	(3) High	(4) Low	(4) Medium	(4) High
Network of low skilled, 2nd neighbors (%)				**1.013** (0.001)	0.955 (0.001)	**1.005** (0.001)	**1.019** (0.001)	0.968 (0.001)	**1.022** (0.001)	0.983 (0.001)	0.954 (0.001)	**1.005** (0.001)
Network of medium skilled, 2nd neighbors (%)				0.943 (0.001)	0.992 (0.001)	0.935 (0.001)	0.937 (0.001)	0.978 (0.001)	0.918 (0.001)	0.960 (0.001)	0.990 (0.001)	0.935 (0.001)
Network of high skilled, 2nd neighbors (%)				**1.049** (0.001)	**1.084** (0.001)	**1.052** (0.001)	**1.045** (0.001)	**1.070** (0.001)	**1.038** (0.001)	**1.058** (0.001)	**1.083** (0.001)	**1.054** (0.001)
Common official language (=1)				**1.913** (0.017)	**1.833** (0.010)	**2.339** (0.014)	**2.504** (0.026)	**3.110** (0.016)	**3.336** (0.017)	**2.605** (0.025)	**1.851** (0.008)	**2.257** (0.010)
Common border (=1)							**1.702** (0.012)	**2.461** (0.013)	**1.864** (0.010)	**1.496** (0.010)	**2.631** (0.016)	**1.758** (0.010)
MIPEX Labor Market Acces Index							0.996 (0.000)	0.992 (0.000)	**1.009** (0.000)	0.985 (0.000)	0.989 (0.000)	**1.005** (0.000)
Avg. combined tax and SSC rate at avg. Income (%)							0.995 (0.001)	0.964 (0.001)	0.982 (0.001)			
NIR(1,1.33)							**1.099** (0.002)	**1.120** (0.002)	**1.111** (0.002)			
Unemployment net replacement rate at avg. Income (%)										**1.037** (0.000)	0.998 (0.000)	**1.003** (0.000)
Pension net replacement rate at avg. Income (%)										0.984 (0.000)	0.993 (0.000)	**1.005** (0.000)
Sickness/healthcare expenditures p.a. and per capita (1,000 €)										0.699 (0.006)	0.863 (0.014)	0.845 (0.012)
PISA science score										0.995 (0.000)	**1.005** (0.000)	0.998 (0.000)
Observations		1163518			1163518			1163518			1163518	
Pseudo-R²		0.084			0.145			0.150			0.149	

Sources: European Labor Force Survey, CEPII, OECD, Eurostat, British Council, WIFO-calculations. – Odds ratios reported. Bold figures indicate odds ratios ≥1. Standard errors in parentheses. Number of observations refers to number of individuals for which choice is modeled. All variables and interactions are statistically significant at the 1% level, except [a] significant at the 10% level (significantly different from "Low skill" value for interactions), [b] significant at the 5% level (significantly different from "Low skill" value at 5% level for interactions), [c] not significant (not significantly different from "Low skill" value for interactions). "Medium skill" and "High skill" columns report product of the base ("Low skill") odds ratio and the odds ratio of the respective variable's interaction term.

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3.6 Conclusions

This chapter analyzed the location choice of migrants to the EU 13 with a special focus on differences in the determinants of location choice by skills. The results show that the location decisions of migrants in the 13 EU-countries considered are mostly governed by income opportunities, labor market conditions like unemployment, the ease of access to labor market, ethnic networks, a common official language as well as the design of the tax system (tax and social security rates, progressivity of the tax system). We do, however, not find strong evidence for the welfare magnet hypothesis – the hypothesis that migrants are attracted to countries or regions with generous welfare benefits. Surprisingly, we find a positive impact of over-qualification among highly skilled workers on the probability of choosing a region, which may be due to endogeneity problems.

Highly skilled workers are more attracted to larger regions, especially capitals, with good income opportunities. Ethnic networks of other highly skilled migrants from the same country of origin already living in the region increase the attractiveness of a region for highly skilled migrants. Ethnic networks of migrants with lower skill levels do, however, not decrease the attractiveness of a region (except for migrants from the EU 15). The same holds true for networks in neighboring regions, as well as networks in second neighbor regions. Thus, as in previous studies (see *Zavodny,* 1999, *Pedersen – Pytlikova – Smith,* 2008), we conclude that networks are the main factors determining the location choices of highly skilled migrants. Furthermore, we improve upon the previous literature by showing that networks in neighboring and second neighbor regions also play an important role for location decisions.

Language knowledge also plays an important role for highly skilled migrants' location decisions. The odds[41] of a highly skilled migrant moving to a region in a country which shares a common official language with his home country are – all else equal – 2.3 to 5.7 times larger. Easier access to the labor market also increases the probability of choosing a specific country/region for migrants outside the EU 15. Highly skilled migrants are also attracted to regions with lower taxes and a lower progressivity of the tax system. Furthermore a higher quality of the schooling system also increases the attractiveness of a country for highly skilled workers. Concerning other variables used to capture the generosity of the welfare system, all regressions show that a larger pension replacement rate increases the probability of moving to a region for highly skilled individuals. In general, we, however, find only weak support for the welfare magnet hypothesis among high-skilled workers.

Comparing the effects of the variables considered on the location decisions of low, medium and high skilled workers, two robust findings with important policy implications can be identified. The first is that skill-differentiated ethnic networks have the largest effect on individuals with the same skill level. i.e., ethnic networks of low skilled migrants mainly attract other low skilled migrants, while ethnic networks of high skilled migrants increase the

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[41] The odds are defined as the probability of choosing a region divided by the probability of not choosing this region. E.g., odds of 2 mean that the probability of choosing a region is twice the probability of choosing a different region.

attractiveness of a region for other highly skilled migrants. Although there are almost no negative effects of ethnic networks on the attractiveness of a region for individuals with higher or lower skill levels and a larger network of low skilled migrants also has a positive influence on the probability that medium and high skilled migrants choose this region, the network effect is, however, considerably smaller than for low skilled migrants. This implies that a given skill structure among established migrants from a specific source country will be "handed down" to future generations of migrants from the same country – thus in a sense "perpetuating" the skill structure in the absence of skill-based regulation and selection. This suggests that there is a lock-in effect with respect to the skill structure of migration from a particular country. Depending on the stock of migrants from a specific sending country it may thus take a long time before and substantial efforts before the skill structure of migrants from a specific country can be changed perceptibly, so that regulation must be sustained for a long period if the share of highly skilled migrants is to be increased.

The second finding is that almost all variables controlled by public policy which affect the attractiveness of a country or region for highly skilled migrants (e.g., the design of the tax or welfare systems, the ease of labor market access for foreigners, the quality of the educational system, etc.) also increase the odds that medium and low skilled migrants will choose this region. This limits the scope of economic policy to affect the skill composition of migrants. Furthermore, the effects on low and medium skilled migrants are often larger than on highly skilled migrants. Thus for instance an increase in the labor market access index for migrants raises the probability that a highly skilled individual moves to this region. It, however, increases the probability of a low skilled individual to migrate to this region even more. The same holds true for the tax progressivity measure as well as the quality of the schooling system (although here the effects are largest for medium skilled individuals). This implies that options to increase the skill level of migrants by creating incentives for highly skilled workers are limited, because almost all policy variables also affect the attractiveness of a country or region for low skilled workers. Thus, changes in these variables cannot affect the skill structure of migrants unless they are accompanied by regulations on low skilled migration. In sum our findings suggest that efforts to improve the skill structure of migrants by policy makers are likely to have only marginal effects once a particular network structure of migration exists.

4. Employment and over- and under-qualification rates of the foreign born in Austria and the EU

The marked differences in the demographic structure of migrants to Austria relative to other EU-countries are also likely to have major implications for the labour market situation of the foreign born, since a number of comparative studies (see for example *EC*, 2008, *OECD*, 2007, 2008) suggest that the migrant structure impacts on integration of the foreign born in a country. For instance with respect to skills more highly skilled workers usually have higher employment rates than less skilled migrants, but differences between natives and foreign born are often larger for the high skilled than for the unskilled (see e.g. *Huber - Hierländer*, 2009, *EC*, 2009). Thus the marked differences in the skill structure of migrants between Austria and the EU may also imply differences in native–foreign born differentials in employment rates in Austria and other EU-countries.

In addition, however, also differences in sending country structure, duration of stay as well as age and gender structure of the foreign born may have countervailing impacts on employment rates of the foreign born. In this respect a number of studies on Austria (e.g. *Bock-Schappelwein et al.,* 2008) suggest substantial variation of the labour market performance of migrants by country of origin, with in particular the Turkish minority facing particular problems in Austria. Furthermore, studies on labor market participation typically find that female as well as older foreign born have markedly lower employment rates than prime age male workers in many European countries (see *Hierländer - Huber,* 2009 for evidence on the EU) and that – after controlling for other differences – foreign born that have a longer duration of residence in their host economy have higher employment rates than more recent migrants (see *Liebig,* 2009, 2008A,B,C for some OECD countries). Thus the higher share of female and older migrants in Austria should contribute to lower employment rates of the foreign born than in other EU-countries, while the higher share of more established migrant groups should contribute to increasing employment rates.

In this chapter we analyze differences in the native to foreign born employment rate differentials across EU-countries and extend on existing literature by arguing that labour market integration of foreign born workers should not only be measured against the yardstick of employment, but also in terms of the match between migrants' qualifications and jobs (see *OECD* 2007). We follow recent contributions to the literature on the skill-education mismatch (see *Chiswick - Miller,* 2007 and *Böheim - Iga - Zweimüller,* 2010 for surveys), by assuming that such a mismatch can arise both because migrants work in jobs which require qualification-levels lower than suggested by their highest educational attainment (in which case they will be considered as over-qualified) or because migrants work in jobs which require qualification levels, that are higher than their actual level of educational attainment (which will make them under-qualified). In accordance with this literature we also argue that the difference in the level of over-qualification between migrants and natives can be

considered a proxy for the difficulties in transferring formal qualifications (of in particular high skilled migrants) across borders, while differences in measures of under-qualification can be considered proxies for the difficulties in transferring work experience (of low skilled migrants).

Our particular interest in this chapter is with three questions. First, we want to know whether significant differences exist between Austria and the remaining EU 13-countries with respect to the labour market situation of the foreign born relative to natives. Second we want to know whether such differences (if they exist) can be explained by differences in the characteristics of the foreign born in terms of their education, country of birth, duration of stay, age and gender and third we want to know what are the most important differences in the determinants of successful labour market integration between the Austria and the other EU 13-countries.

These issues are also interesting from a policy perspective, since answers to these questions can provide guidance as to which groups of the foreign born are particularly strongly disadvantaged in Austria relative to the EU 13 and could indicate whether significant differences in the labour market integration of foreigners can largely be attributed to the particularities of the structure of the foreign born, or are due primarily to differences in the operation of the labour market. This could in turn contribute to a better understanding of the interaction of migration and integration policy instruments in shaping labour market integration of the foreign born.

4.1   Measurement and Stylized Facts

Employment Rates

Throughout this chapter we analyse three indicators of labor market success. As a first indicator we focus the employment rate as defined in the EU-LFS. This is the number of persons in paid employment for at least one hour in the week preceding the interview in percent of the total working age population of a country. Considering this indicator suggests that the employment rate of natives is substantially higher, but the employment rate of the foreign born is slightly lower than in the EU 13 in Austria (see Figure 4.1). The employment rate among natives was 72.2% in Austria in the average of the years 2006 and 2007 (which was the 5th highest employment rate in that time period). At the same time the employment rate of foreign born was 64.2% (as opposed to 64.7% in the average of the EU 13) which is only the 9th highest employment rate in our sample of countries. Accordingly the native-foreign employment rate differential was the sixth highest among the EU 13-countries and by 5.7 percentage points higher than in the average of the EU 13.

In addition – although employment rates increase with educational attainment for both natives and foreigners – they increase less rapidly for the foreign born than for the natives in most EU-countries. In Austria this tendency is particularly pronounced. Here the employment rate of the low skilled foreign born (with 53.1%) is actually higher than for the low skilled

natives (50.0%) and only 4 EU-countries (Spain, Greece, Italy and Luxemburg) have lower native foreign born employment rate differentials for low skilled (see table 4.1).

Figure 4.1: Employment rates of the EU-population aged 15-64 by place of residence and region of birth
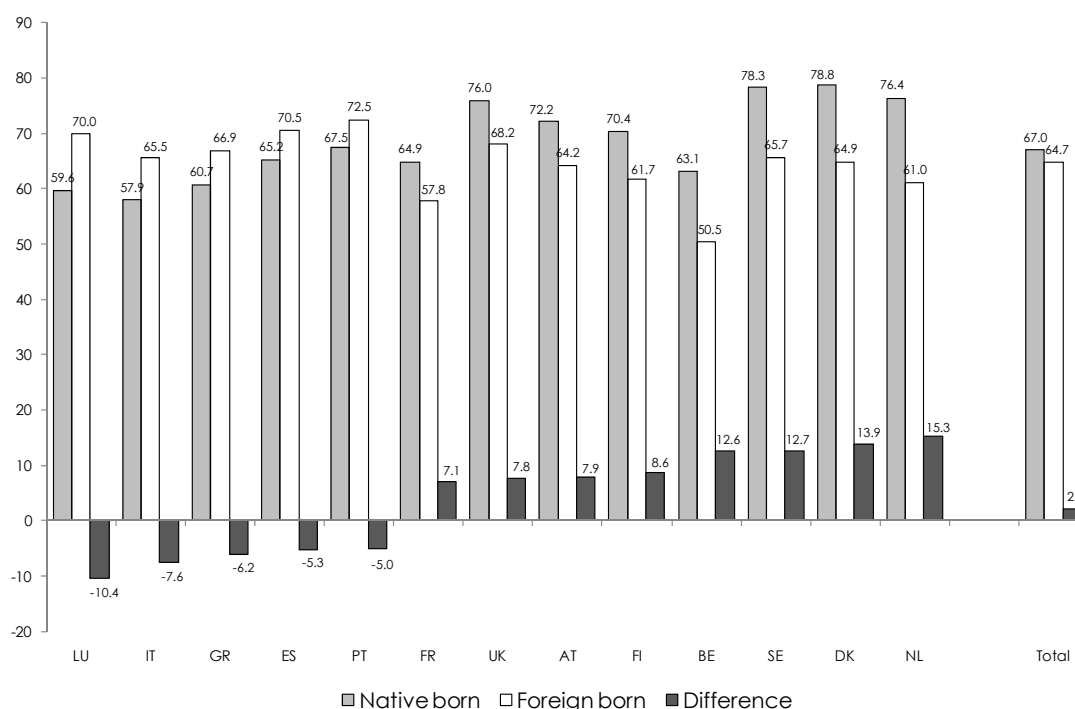
Average 2006 & 2007, in %

Source: EU-LFS. – Notes: Base population aged 15-64, excluding Germany and Ireland, excluding unkown highest completed education and unknown country of birth.

By contrast, the highly skilled foreign born had an employment rate of 75.0% in Austria in the average of the years 2006 and 2007. This was by 13.6 percentage points lower than for natives, which is the highest native-foreign born differential for highly skilled in the EU 13. For the foreign born with medium skill levels the employment rate was 69.1%. This was by 7.3 percentage points lower than for natives, which is the 5th highest native foreign differential among the EU 13.

Similar stylized facts apply when considering employment rates by country of birth. Here employment rates of migrants born in the EU 27 countries in Austria rank substantially worse than those of those born outside the EU 27 (see figure 4.2). Among the EU 13-countries the employment rate of those born in the EU 27 – although higher than among the migrants born in third countries (who have an employment rate of 62.4%) – is only the 9th highest (with 67.8%), while it is the 5th highest for the foreign born from 3rd countries.

When by contrast considering duration of stay differences are much smaller. More recent migrants (with an employment rate of 57.3%) in Austria have the 9th highest employment rate,

while the more established migrants (with an employment rate of 67.6%) have the 8th highest among the EU 13-countries.

Table 4.1: Employment rates of the EU population aged 15-64 by place of residence and educational attainment

Average 2006 & 2007, in %

	Low skilled			Medium skilled			High skilled		
	Natives	Foreign born	Difference	Natives	Foreign born	Difference	Natives	Foreign born	Difference
AT	50.0	53.1	−3.2	76.3	69.1	7.3	88.6	75.0	13.6
BE	41.2	35.3	6.0	66.8	54.4	12.3	84.4	72.7	11.6
DK	63.9	52.6	11.3	82.0	66.2	15.8	88.2	77.9	10.4
ES	55.3	63.9	−8.7	66.2	73.9	−7.7	82.7	76.7	6.0
FI	46.9	41.9	5.1	73.9	69.2	4.7	85.5	74.2	11.3
FR	46.6	49.5	−3.0	69.8	62.6	7.2	80.3	68.3	12.0
GR	50.7	66.9	−16.2	60.3	65.1	−4.8	82.7	71.9	10.8
IT	45.3	59.4	−14.0	67.7	70.7	−3.0	78.2	74.2	4.0
LU	40.5	61.1	−20.6	67.5	68.1	−0.7	83.7	84.0	−0.4
NL	61.2	46.9	14.3	80.8	65.0	15.8	87.6	76.3	11.3
PT	65.7	68.3	−2.6	63.7	71.5	−7.8	84.2	85.3	−1.0
SE	54.8	47.2	7.6	81.9	68.2	13.7	89.0	77.1	11.9
UK	61.3	47.1	14.1	77.8	69.7	8.1	88.2	82.5	5.7
EU 13	52.4	54.4	−2.1	71.9	68.5	3.5	83.9	76.2	7.7

Source: EU-LFS. – Notes: Base population aged 15-64 excluding native born population, excluding Germany and Ireland, excluding unkown highest completed education and unknown country of birth. Low skilled = ISCED 0-2, medium skilled = ISCED 3-4, high skilled = ISCED 5 or more.

Figure 4.2: Employment rates of foreign born by country of residence and region of birth and duration of stay
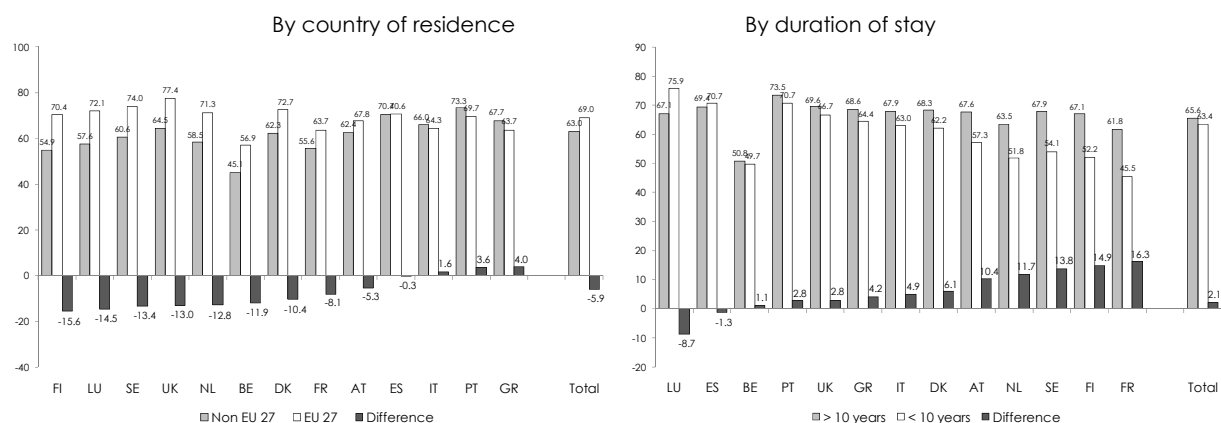
Average 2006 & 2007, in %

Source: EU-LFS. – Notes: Base population aged 15-64, excluding Germany and Ireland, excluding unkown highest completed education and unknown country of birth, values in brackets have a low reliability. - = data provides too few observations to be reported.

Over-qualification

As argued in the introduction labour market access of migrants should, however, not only be measured against the yardstick of employment, but also in terms of the match between qualifications and jobs (see *OECD,* 2007). Here we use the job analysis provided by *OECD* (2007) to measure over- and under-qualification (see also *Hierländer - Huber* (2008) for details). This links the standard international taxonomy of highest educational attainment (ISCED) to the international classification of occupations (ISCO) at the 1 digit level (see table 4.2). Based on this link we define a person as over-qualified if her/his actual level of educational attainment is higher than that required for the occupation and under-qualified if the actual level of educational attainment is lower than that required for the occupation.[42] Thus according to or definition for instance a person with a tertiary education (ISCED 5,6) working as a clerk is over-qualified, while a person with at most completed compulsory education (ISCED 0,1,2) working as a clerk is under-qualified.

Table 4.2: Correspondence of Major job groups (ISCO-88) and required skill levels (ISCED-97) using the job analysis method according to the OECD

ISCO-88 Major groups	Demanded skill level	
1: Legislators, senior officials and managers	High skilled	ISCED 5,6
2: Professionals		ISCED 5,6
3: Technicans and associate professionals		ISCED 5,6
4: Clerks	Medium skilled	ISCED 3,4
5: Service workers and shop and market sales workers		ISCED 3,4
6: Skilled agricultural and fishery workers		ISCED 3,4
7: Craft and related trades workers		ISCED 3,4
8: Plant and machine operators and assemblers		ISCED 3,4
9: Elementary occupations	Low skilled	ISCED 0,1,2
(0: Armed forces)	No assignment	

Source: *OECD* (2007).

According to this definition 8.9% of the natives, employed in the EU 13 were over-qualified in the average of the years 2006 and 2007. For the foreign born this percentage was 17.0%.

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[42] Note that over- and under-qualification are defined as an employee's characteristic relative to the occupation he/she holds. A consequence of this is that highly skilled workers cannot be under-qualified (since no occupation requires an educational attainment higher than tertiary education). Similarly, low skilled workers cannot be over-qualified (since no occupation requires an education lower than primary education). One problem with this measurement is the broad definition of occupational categories. This may create problems if these broad categories include jobs, which require different educational attainment levels. Despite this caveat, however, our approach can be justified by our focus on differences in over- and under-qualification rates between foreigners and natives. To the degree that the structure of occupations within the broad categories is similar between natives and foreign born, focusing on these differences will reduce measurement error. However, country study evidence, with more detailed occupational grouping, suggests that focusing on e.g. the two digit ISCO level, does result in changes to aggregate measures of over-qualification (see *Bock-Schappelwein et al.*, 2008).

Similarly 38.7% of the employed natives in the EU 13 were under-qualified, while for the foreign born this percentage was 31.7% (see table 4.3).

The rates of over-qualification, however, vary substantially between EU-countries. The country with the highest rate of over-qualification among the natives was Spain (where 13.3% of the natives were over-qualified) and the lowest rate of over-qualification among natives was registered in Luxembourg (with 1.4%). Among the foreign born the rates of over-qualification were higher than among natives in all countries, but highest in Spain (with 26.7%) and lowest in Luxemburg (with 3.9%).[43]

Table 4.3: Share of under-, accordingly- and over-qualified employed aged 15-64 by place of residence

Average 2006 & 2007, in %

	Natives			Foreign born			Difference		
	under-qualified	accordingly qualified	over-qualified	under-qualified	accordingly qualified	over-qualified	under-qualified	accordingly qualified	over-qualified
AT	35.6	55.6	8.7	27.8	56.4	15.8	7.8	–0.8	–7.1
BE	28.7	59.3	11.9	32.1	53.3	14.7	–3.3	6.0	–2.7
DK	30.8	61.3	7.9	27.5	58.3	14.3	3.3	3.0	–6.3
ES	40.0	46.8	13.3	25.5	47.8	26.7	14.5	–1.0	–13.4
FI	26.1	62.9	11.0	34.9	49.8	15.3	–8.8	13.1	–4.4
FR	31.6	58.5	10.0	37.8	50.3	11.9	–6.2	8.2	–2.0
GR	41.8	52.6	5.6	33.2	46.7	20.1	8.6	5.9	–14.5
IT	54.8	41.4	3.8	38.8	46.7	14.6	16.0	–5.2	–10.7
LU	41.2	57.4	1.4	29.5	66.7	3.9	11.7	–9.2	–2.4
NL	38.4	55.1	6.5	32.2	56.1	11.7	6.2	–1.0	–5.3
PT	64.9	32.7	2.4	43.1	47.3	9.6	21.8	–14.6	–7.2
SE	29.3	64.1	6.6	24.8	61.3	14.0	4.6	2.9	–7.5
UK	30.9	57.4	11.7	28.5	54.6	16.9	2.4	2.9	–5.2
EU 13	38.7	52.4	8.9	31.7	51.3	17.0	7.0	1.1	–8.1

Source: EU-LFS. – Notes: Base employed aged 15-64 excluding, excluding Germany and Ireland, excluding unkown highest completed education and unknown country of birth.

This is somewhat in contrast to the situation with respect to under-qualification rates. Here too there is a wide variation among countries, with the highest under-qualification rates among natives (of 64.9%) as well as foreign born (43.1%) found in Portugal and the lowest among natives in Finland (26.1%) and among foreign born in Sweden (24.8%). In contrast to the over-qualification rates, however, under-qualification rates among the foreign born are higher in three countries (Finland, France and Denmark) than among natives.

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[43] These results are consistent with estimates of over- and under-qualification in the literature. The OECD (2007) using similar methods as ours also finds that Spain was also the country with the highest over-qualification rates among native and foreign born and that Luxembourg was the country with the lowest over-qualification rate in the years 2003 and 2004.

Table 4.4: Over- and under-qualification rates by educational attainment and country of residence

Average 2006 & 2007, in %

	AT	BE	DK	ES	FI	FR	GR	IT	LU	NL	PT	SE	UK	EU 13
							Low skilled							
							Natives							
Under-qualified	78.4	78.1	73.4	79.0	83.4	80.8	90.5	84.7	82.1	78.0	83.9	87.0	78.6	81.4
Accordingly qualified	21.6	21.9	26.6	21.0	16.6	19.2	9.5	15.3	17.9	22.0	16.1	13.0	21.4	18.6
							Foreign born							
Under-qualified	55.0	71.6	63.2	58.4	78.9	68.9	66.1	69.2	55.0	65.2	72.9	75.2	73.2	66.3
Accordingly qualified	45.0	28.4	36.8	41.6	21.1	31.1	33.9	30.8	45.0	34.8	27.1	24.8	26.8	33.7
						Difference (in percentage points)								
Under-qualified	23.7	6.5	10.1	20.5	4.7	12.0	24.6	15.7	27.1	12.9	12.0	11.8	5.4	15.3
Accordingly qualified	−23.7	−6.5	−10.1	−20.5	−4.7	−12.0	−24.6	−15.7	−27.1	−12.9	−12.0	−11.8	−5.4	−15.3
							Medium Skilled							
							Natives							
Under-qualified	35.1	29.2	31.2	26.8	25.0	27.6	26.7	48.6	38.7	42.2	35.2	30.4	28.5	33.5
Accordingly qualified	57.7	61.5	60.9	65.3	65.2	64.1	70.3	47.1	59.3	52.2	59.6	64.1	61.5	59.2
Over-qualified	7.3	9.3	7.9	7.9	9.9	8.3	3.0	4.3	2.0	5.6	5.2	5.5	10.0	7.4
							Foreign born							
Under-qualified	22.2	30.0	26.4	10.0	35.9	31.0	6.6	18.9	34.6	31.6	25.0	23.8	34.4	24.5
Accordingly qualified	57.8	55.6	59.4	58.0	50.6	54.4	64.9	60.0	58.0	54.7	59.8	66.6	48.6	55.6
Over-qualified	20.0	14.3	14.2	32.0	13.5	14.6	28.6	21.2	7.3	13.7	15.2	9.6	17.0	19.9
						Difference (in percentage points)								
Under-qualified	12.7	−0.9	4.9	16.6	−11.2	−3.2	20.3	29.8	4.1	10.8	10.4	6.5	−6.1	8.9
Accordingly qualified	0.0	5.9	1.2	7.4	15.0	9.5	5.4	−12.9	1.3	−2.7	−0.4	−2.5	12.9	3.5
Over-qualified	−12.7	−5.0	−6.1	−24.0	−3.8	−6.3	−25.6	−16.9	−5.4	−8.0	−10.0	−3.9	−6.8	−12.4
							High skilled							
							Natives							
Accordingly qualified	78.1	78.5	86.5	67.2	82.3	79.9	83.1	88.1	98.1	87.0	88.4	88.4	77.6	79.1
Over-qualified	21.9	21.5	13.5	32.8	17.8	20.2	16.9	11.9	1.9	13.0	11.6	11.6	22.4	21.0
							Foreign born							
Accordingly qualified	70.6	72.5	74.3	42.2	69.9	73.6	39.7	57.7	95.5	80.0	76.2	72.6	75.6	66.4
Over-qualified	29.4	27.5	25.7	57.8	30.1	26.4	60.3	42.3	4.5	20.0	23.8	27.4	24.4	33.6
						Difference (in percentage points)								
Accordingly qualified	7.3	6.0	12.0	25.0	12.6	6.1	42.7	30.5	2.6	6.8	12.1	15.5	1.7	12.4
Over-qualified	−7.3	−6.0	−12.0	−25.0	−12.6	−6.1	−42.7	−30.5	−2.6	−6.8	−12.1	−15.5	−1.7	−12.4

Source: EU-LFS. – Notes: Base employed aged 15-64, excluding Germany and Ireland, excluding unknown highest completed education and unknown country of birth. Low skilled = ISCED 0-2, medium skilled = ISCED 3-4, high skilled = ISCED 5 or more.

Among the EU 13 Austria has about average over-qualification rates (of about 8.7%) for natives and slightly below average rates (of 15.8%) for foreign born. Thus also the native-foreign differential in over-qualification rates (7.1 percentage points) is slightly lower in Austria than in the EU 13 (8.1 percentage points). By contrast under-qualification rates (with 35.6% for natives and 27.8% for foreign born) are below the EU 13 average but the foreign native differential (of 7.8 percentage points) is slightly higher than the EU 13 average (7.1 percentage points). Austria is thus neither a country with particularly large nor particularly low aggregate native-foreign differentials in over- and under-qualification rates relative to the EU 13.

This result could, however, be distorted by differences in skill structure among the foreign born and natives. In particular since Austria is a country with a low share of highly skilled natives and foreign born, and since the highly skilled are also the most likely to be over-qualified, this may bias rates of over-qualification downward. In table 4.4 we thus control for this potential bias by calculating rates of over- and under-qualification for foreign born and natives by educational attainment levels. This, however, changes results with respect to the relative position of Austria only marginally. Rates of over-qualification are slightly higher than in the EU 13 for medium skilled foreign born and highly skilled natives, but below average for the highly skilled foreign born and medium skilled natives, and native-foreign differentials in over-qualification rates are about equal to the EU average for highly skilled.

Similarly under-qualification rates for the medium skilled natives are slightly above the EU 13 average of 33.5% in Austria, while they are slightly lower than in the EU 13 for the medium skilled foreign born. The only indicators where Austria shows large deviations from the EU 13 average are under-qualification rates of the low skilled. These are slightly lower than in the EU 13 average for natives but substantially lower for the foreign born, so that also the native-foreign differential in under-qualification rates is substantially higher than in the EU 13 average. Here Austria ranks third among the 13 EU-countries for the unskilled and 4th for the medium skilled.

In addition over- and under-qualification also vary by duration of stay (see table 4.5). In particular – although over-qualification rates of the foreign born are falling in the duration of stay in all EU-countries, they fall less strongly in Austria than elsewhere, which leads to Austria having the third highest over-qualification rate among the more established migrants while over-qualification rates of recent migrants, who have lived in Austria for less than 10 years, are the 4th lowest among the EU 13-countries. By contrast the opposite applies to under-qualification rates, which are the third highest among the EU 13 for the more established foreign born, but the fifth lowest for recent migrants. This may indicate a slower recognition of skills of foreign born in Austria than in the many of the other EU-countries.

Differences with respect to sending country regions in the over- and under-qualification rates of the foreign born (see table 4.5), finally, seem to be of lesser importance. Here both rates of over- and under-qualification of migrants born in the EU 27 as well as of migrants born outside

the EU 27 are somewhat below the EU 13 average in Austria and rank between the 3rd and the 6th place among the EU-countries.

Table 4.5: Over- and under-qualification rates by country of residence and duration of stay
Average 2006 & 2007, in %

	AT	BE	DK	ES	FI	FR	GR	IT	LU	NL	PT	SE	UK	EU 13
					Duration of Residence: 10 yearsor more									
Under-qualified	29.4	34.3	29.2	37.3	32.3	39.6	31.8	43.6	36.0	34.0	48.5	26.3	28.9	35.6
Accordingly qualified	56.2	53.1	60.5	48.6	53.0	50.6	48.2	46.1	61.1	56.0	46.3	61.3	57.3	52.7
Over-qualified	14.5	12.6	10.2	14.1	14.7	9.8	20.0	10.4	2.9	10.0	5.2	12.5	13.8	11.7
					Duration of Residence:less than 10 years									
Under-qualified	24.2	26.8	23.2	21.7	41.7	30.3	35.2	33.3	19.1	23.8	32.6	16.3	28.0	26.5
Accordingly qualified	57.0	53.7	57.1	46.9	41.1	48.8	44.6	47.3	75.5	56.7	49.2	58.9	51.3	49.3
Over-qualified	18.9	19.5	19.7	31.4	17.2	20.9	20.2	19.4	5.5	19.5	18.2	24.7	20.7	24.3
					Country of birth: EU 27									
Under-qualified	26.0	33.1	24.7	22.7	37.3	41.4	24.7	33.1	30.3	28.1	40.4	28.1	25.8	29.9
Accordingly qualified	59.6	54.5	62.3	49.5	49.7	50.3	54.5	52.6	67.1	61.8	50.8	62.9	54.6	53.8
Over-qualified	14.4	12.3	13.0	27.8	13.0	8.3	20.9	14.3	2.6	10.1	8.8	9.0	19.6	16.3
					Country of birth: non EU-country									
Under-qualified	28.9	30.9	28.5	26.7	32.5	36.2	35.3	40.8	23.3	33.4	43.9	22.3	29.9	32.4
Accordingly qualified	54.6	52.0	56.8	47.1	49.9	50.2	44.8	44.5	63.5	54.4	46.3	60.0	54.6	50.2
Over-qualified	16.5	17.1	14.7	26.2	17.6	13.6	19.9	14.7	13.2	12.2	9.8	17.7	15.6	17.3

Source: EU-LFS. – Notes: Base employed aged 15+ excluding, excluding Germany and Ireland, excluding unknown highest completed education and unknown country of birth, values in brackets have a low reliability. - = data provides too few observations to be reported.

4.2   An aggregate decomposition of foreign-native differentials

Method

This descriptive evidence thus suggests that – relative to other EU 13 – countries native-foreign differentials in employment rates are particularly high for the high skilled in Austria, while native-foreign differentials in under-qualification rates are particularly high for the low-skilled and that more established foreign born experience a smaller reduction in over- and under-qualification rates than elsewhere in the EU 13. It, however, provides only little indication as to the causes and significance of the differences found.

Such indication can be found only by a more formal analysis of native-foreign differentials. In particular denoting overall differences in native-foreign employment (or respectively in over- and under-qualification) rate differentials between Austria and the other EU 13-countries as

$\Delta y^{A,E}$ (with y a place holder for the indicator analyzed), and considering the definition of this difference we can either write this differential as: [44]

$$(4.1) \qquad \Delta y^{A,E} = (y_N^E - y_F^E) - (y_N^A - y_F^A)$$

Or equivalently as:

$$(4.2) \qquad \Delta y^{A,E} = (y_N^E - y_N^A) - (y_F^E - y_F^A)$$

Thus equations (4.1) and (4.2) provide two alternative (and admittedly quite trivial) possibilities to decompose native-foreign differences in employment as well as over and under-qualification rates. Applied for instance to employment rates equation (4.1) states that the native foreign differences in employment rates between the EU 13 and Austria are equivalent to the native-foreign differentials in employment rates in the EU minus the native-foreign differentials in employment rates in Austria. Equation (4.2) states that they can equally well be considered to be the differences between employment rates of natives in the EU and Austria minus the differences between employment rates of foreigners in the EU and Austria.

The significance of the different components of these decompositions can be tested by means of a probit analysis. [45] In this analysis the probability of a person being employed, over- or under-qualified (denoted as y_i) is given by:

$$(4.3) \qquad y_i = \beta_N^{EU} + \beta_N^{AT} D_N^{AT} + \beta_F^{EU} D_F^{EU} + \beta_F^{AT} D_F^{AT}$$

with D_N^{AT}, D_F^{EU}, and D_F^{AT} dummy variables that take on the value of 1 if the person under consideration lives in Austria and is a native (D_N^{AT}), lives in another country of the EU 13 other than Austria and is foreign born (D_F^{EU}), or lives in Austria and is foreign born (D_F^{AT}), By noticing that: $y_N^E - y_F^E = -\tilde{\beta}_F^{EU}$, $y_N^A - y_F^A = \tilde{\beta}_N^{AT} - \tilde{\beta}_F^{AT}$, $y_N^E - y_N^A = -\tilde{\beta}_N^{AT}$ and $y_F^E - y_F^A = \tilde{\beta}_F^{EU} - \tilde{\beta}_F^{AT}$ these restrictions can be tested for significance by means of an appropriate t-test of linear restrictions.

Results

The results of this procedure when using employment rates as a dependent variable (shown in the first column of table 4.6) suggest that the average foreign born living in the EU has an employment rate that is (statistically significantly) by 2.1 percentage points lower than the average native living in an EU 13-country other than Austria (that as shown above has an employment probability of 67.0%). For the average foreign born living in Austria, by contrast, the employment rate is by 2.6 percentage points lower, than for the average native living in EU 13-countries other than Austria but this difference is statistically significant at the 10% level, only.

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[44] In this equation y_N^A is the indicator for natives in Austria and y_F^A is the same indicator for foreign born residing in Austria. Similarly y_N^E is the indicator for natives residing in other EU 13-countries and y_F^E the same indicator for foreign born residing in other EU 13-countries.

[45] In this analysis we assume that a person in our sample will be employed (or over-qualified or under-qualified, respectively) with probability $(Y_i = 1) = 1 - F(y_i)$, where F(.) is the standard normal distribution and y_i is a latent variable for individual i which is related to a vector of individual characteristics for the same individual i.

Thus with respect to the two comparisons suggested above native-foreign differentials in employment rates are significantly (by 5.9 percentage points) higher in Austria than in the other EU 13-countries. The decomposition in equation (4.1), however, suggests that this is primarily due to higher employment rates of natives in Austria than in the EU, rather than to lower employment rates of foreign born. The average native living in Austria has an employment rate that is significantly (by 5.4 percentage points) higher than that of a native living in another EU-country, but the average foreign born living in Austria has a by 0.5 percentage point (statistically insignificantly) lower employment rate than the average foreign born living in another EU 13-country. Thus the native-foreign differential in Austria is 8.0 percentage points which is statistically different from zero, while in the other EU-countries it amounts only to 2.1 percentage points.

Table 4.6: Probit regression results for equation 4.3

	Employment rate			Over-qualification rate			Under-qualification rate		
	Marginal Effect		S.E.	Marginal Effect		S.E.	Marginal Effect		S.E.
				Model Estimation Results					
Native in EU									
Native in Austria	0.054	***	0.007	–0.028	***	0.006	–0.108	***	0.010
Foreign born in EU 13	–0.021	***	0.004	0.126	***	0.005	–0.106	***	0.005
Foreign born in Austria	–0.026	*	0.017	0.101	***	0.021	–0.195	***	0.021
Number of Observations	827,976			484,546			547,459		
Pseudo R2	0.0040			0.0133			0.0044		
log likelihood	–124,315			–36,096.5			–64,169.5		
				Decomposition 1					
Total Differences	–0.059	***	0.013	0.004		0.009	0.018		0.015
Foreign born EU - Foreign born AT	0.005		0.007	0.025		0.022	0.090	**	0.011
Native in EU – Native in Austria	–0.054	***	0.007	0.028	***	0.006	0.108	***	0.010
				Decomposition 2					
Total Differences	–0.059	***	0.013	0.003		0.010	0.018		0.019
Native - Foreign born in EU	0.021	***	0.004	–0.126	***	0.005	0.106	***	0.005
nat fb diff AT	0.080	***	0.009	–0.129	***	0.025	0.088	***	0.027

Source: EU-LFS, WIFO-calculation. – Notes: Table reports marginal effects of a probit model. *** (**) (*) – signify significance at the 1%, (5%), (10%) level respectively. S.E. = standard error of the estimate.

Results with respect to over-qualification (in column 2 of table 4.6), by contrast, suggest that natives in Austria in average have a by 2.8 percentage points lower probability of being over-qualified than the average native residing in another EU 13-country (who has an average probability of being over-qualified of 8.9%) but that for foreign born residing in Austria the over-qualification risk is by 2.5 percentage points higher than for the foreign born living in another EU-country. Thus the native foreign differential in Austria is 12.9 percentage points. In

other EU-countries it is 12.6 percentage points. The native-foreign differentials in over-qualification rates are thus slightly (but statistically insignificantly higher) in Austria than in the other EU 13-countries.

For the probability of under-qualification we find that natives residing in Austria have a by 10.8 percentage point lower probability of under-qualified employment than natives residing in other countries of the EU and that the average foreign born living Austria has a 9 percentage point lower probability to be under-qualified than the average foreign born residing in other EU-countries. Native foreign differentials thus amount to 8.8 percentage points while they are 10.6 percentage points in other EU 13-countries. The difference in the native-foreign differentials between those living in Austria and those living in other countries is thus 1.8 percentage points, which remains statistically insignificant.

In sum, the average foreign born both in Austria as well as in other EU 13-countries faces significantly higher over-qualification risks and lower employment and under-qualification risks than the native born. Furthermore, foreigners in Austria also face worse labour market outcomes than foreign born residing in other EU-countries with respect to employment and under-qualification rates, but this difference is statistically significant only with respect to under-qualification. The native-foreign differential is, however, significantly larger in Austria than in the EU only with respect to employment rates.

4.3   Detailed decompositions of foreign-native differentials

Method

This decomposition can, however, not give answer to how strongly differences in native-foreign differentials between Austria and the EU are influenced by differences in the structure of the foreign born population between these two regions. This is of relevance because a sizeable literature has shown that the probability of employment as well as for over- and under-qualification of both natives and foreigners is highly dependent on age, gender and education and that for foreigners in addition sending country and duration of stay have an important impact on employment as well as over- and under-qualification rates. In general this literature finds that females have higher rates of over-qualification but lower employment and under-qualification rates (see *Kiker - Santos - Oliveira*, 2000, *Büchel - Battu*, 2003), that employment rates peak in the middle age groups but are lower for the very young and the old, while rates of over-qualification as well as of under-qualification increase with age (see *Rubb,* 2003) and that the more educated have higher employment but also over-qualification rates (see *Sanroma - Ramos - Simon,* 2008). Furthermore, for foreign born employment rates and under-qualification rates increase with duration of stay in the host country (and the associated improved labour market integration) and a number of authors find evidence of sending country effects (see *Chiswick - Miller,* 2007, *Sanroma - Ramos - Simon,* 2008), which may be interpreted either as habit persistence effects or group specific discrimination.

Comparisons of native foreign differentials between different countries thus should also take into account the potential composition effect of the foreign born. This can be achieved by assuming that the employment (over-qualification and under-qualification) probability of native i in region k ($y_{i,N}^k$) is determined by a function of a vector of individual characteristics ($X_{i,N}^k$) such that:

$$y_{i,N}^k = F\left(\alpha_N^k X_{i,N}^k\right)$$

with α_N^k a parameter specific to natives in region k and F(.)the standard normal distribution and assuming that the employment (over-qualification and under-qualification) probability of a foreign born (indexed by i) ($y_{i,F}^k$) is determined by:

$$y_{i,F}^k = F\left(\alpha_F^k X_{i,F}^k + \lambda^k Z_{i,F}^k\right)$$

Where $X_{i,F}^k$ are the same variables as for natives (but for foreigners) and the $Z_{i,F}^k$ are variables that can only be observed for foreigners (such as dummy variables for the country of birth and the duration of stay in the host country).

Given these functions equations (4.1) and (4.2) can be written as[46]:

(4.4) $\quad \Delta y^{A,E} = \left[\overline{F\left(\widetilde{\alpha}_N^E X_{i,N}^E\right)} - \overline{F\left(\widetilde{\alpha}_F^E X_{i,F}^E + \widetilde{\lambda}^E Z_{i,F}^E\right)}\right] - \left[\overline{F\left(\widetilde{\alpha}_N^A X_{i,N}^A\right)} - \overline{F\left(\widetilde{\alpha}_F^A X_{i,F}^A + \widetilde{\lambda}^A Z_{i,F}^A\right)}\right]$

and

(4.5) $\quad \Delta y^{A,E} = \left[\overline{F\left(\widetilde{\alpha}_N^E X_{i,N}^E\right)} - \overline{F\left(\widetilde{\alpha}_N^A X_{i,N}^A\right)}\right] - \left[\overline{F\left(\alpha_F^E X_{i,F}^E + \widetilde{\lambda}^k Z_{i,F}^E\right)} - \overline{F\left(\widetilde{\alpha}_F^A X_{i,F}^A + \widetilde{\lambda}^k Z_{i,F}^A\right)}\right]$

Equation (4.4) can be further developed by adding and subtracting the prediction of y_F^E under the assumption that the foreigners in the EU 13 had the same characteristics as the natives in the EU (i.e. $\overline{F\left(\widetilde{\alpha}_F^E X_{i,N}^E + \widetilde{\lambda}^E Z_{i,F}^E\right)}$) as well as the prediction of y_F^E under the assumption that the foreigners in Austria in our sample have the same characteristics as the natives in Austria (i.e. $\overline{F\left(\widetilde{\alpha}_F^A X_{i,N}^A + \widetilde{\lambda}^A Z_{i,F}^A\right)}$). This gives:

(4.6) $\quad \Delta y^{A,E} = \left[\left\{\overline{F\left(\widetilde{\alpha}_N^E X_{i,N}^E\right)} - \overline{F\left(\widetilde{\alpha}_F^E X_{i,N}^E + \widetilde{\lambda}^E Z_{i,F}^E\right)}\right\} + \left\{\overline{F\left(\widetilde{\alpha}_F^E X_{i,N}^E + \widetilde{\lambda}^E Z_{i,F}^E\right)} - \overline{F\left(\widetilde{\alpha}_F^E X_{i,F}^E + \widetilde{\lambda}^E Z_{i,F}^E\right)}\right\}\right]$
$\quad\quad + \left[\left\{\overline{F\left(\widetilde{\alpha}_N^A X_{i,N}^A\right)} - \overline{F\left(\widetilde{\alpha}_F^A X_{i,N}^A + \widetilde{\lambda}^A Z_{i,F}^A\right)}\right\} - \left\{\overline{F\left(\widetilde{\alpha}_F^A X_{i,N}^A + \widetilde{\lambda}^A Z_{i,F}^A\right)} - \overline{F\left(\widetilde{\alpha}_F^A X_{i,F}^A + \widetilde{\lambda}^A Z_{i,F}^A\right)}\right\}\right]$

Equation (4.6) is a generalization of the well known Oaxaca-Blinder decomposition and states that the differences in native-foreign differentials between the EU and Austria can be decomposed into four components:

- The first ($\left\{\overline{F\left(\widetilde{\alpha}_N^E X_{i,N}^E\right)} - \overline{F\left(\alpha_F^E X_{i,N}^E + \widetilde{\lambda}^E Z_{i,F}^E\right)}\right\}$) is the foreign-native differential in employment (over-qualification and under-qualification) rates that would result if the foreign born in the EU had exactly the same characteristics (age, gender and education structure) as the natives and measures the impact of the differences in the parameters effect between natives and foreigners for the EU

- The second ($\left\{\overline{F\left(\widetilde{\alpha}_F^E X_{i,N}^E + \widetilde{\lambda}^E Z_{i,F}^E\right)} - \overline{F\left(\widetilde{\alpha}_F^E X_{i,F}^E + \widetilde{\lambda}^E Z_{i,F}^E\right)}\right\}$) is the predicted foreign-native differential in employment (over- and under-qualification) rates if the foreign born in the

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[46] In writing this we assume that the mean prediction of $y_{i,n}^k$ which is denoted by $\overline{F(.)}$ satisfies $\overline{F(.)} = y_n^k$. This is, however, always given in the analysis below

EU had exactly the same parameters governing their employment (over-qualification and under-qualification) rates as the natives. Any differences that can be found with respect to this component can be attributed to differences in characteristics of natives and foreign born in the EU. This is thus the difference in characteristics effect between natives an foreigner in the EU

- The third effect ($\{\overline{F(\widetilde{\alpha}_N^A X_{i,N}^A)} - \overline{F\left(\widetilde{\alpha}_F^A X_{i,N}^A + \widetilde{\lambda}^A Z_{i,F}^A\right)}\}$) measures the foreign-native differential in employment (over- and under-qualification) rates if the foreign born residing in Austria had exactly the same characteristics as an Austrian native and is called the differences in the parameters effect between natives and foreigners for Austria

- The fourth component ($\{\overline{F\left(\widetilde{\alpha}_N^A X_{i,N}^A + \widetilde{\lambda}^A Z_{i,F}^A\right)} - \overline{F\left(\widetilde{\alpha}_F^A X_{i,F}^A + \widetilde{\lambda}^k Z_{i,F}^A\right)}\}$) is the foreign-native differential in employment (over-qualification and under-qualification) rates that would be predicted if the foreign born residing in Austria had exactly the same parameters governing their employment (over-qualification and under-qualification) rates as the natives. It is thus analogous to the second effect for the EU and is referred to as the difference in characteristics effect between natives an foreigner in Austria.

Similarly, equation (4.5) can be expanded to give:

$$(4.7) \quad \Delta y^{A,E} = \left[\{\overline{F(\widetilde{\alpha}_N^E X_{i,N}^A)} - \overline{F(\widetilde{\alpha}_N^A X_{i,N}^A)}\} + \{\overline{F(\widetilde{\alpha}_N^E X_{i,N}^E)} - \overline{F(\widetilde{\alpha}_N^E X_{i,N}^A)}\}\right]$$
$$- \left[\{\overline{F\left(\widetilde{\alpha}_F^E X_{i,F}^A + \widetilde{\lambda}^E Z_{i,F}^A\right)} - \overline{F\left(\widetilde{\alpha}_F^A X_{i,F}^A + \widetilde{\lambda}^A Z_{i,F}^A\right)}\} + \{\overline{F\left(\widetilde{\alpha}_F^E X_{i,F}^E + \widetilde{\lambda}^E Z_{i,F}^E\right)} - \overline{F\left(\widetilde{\alpha}_F^E X_{i,F}^A + \widetilde{\lambda}^E Z_{i,F}^A\right)}\}\right]$$

which once more is a version of the Oaxaca-Blinder decomposition, where, however, the four components, have a slightly different interpretation. In particular:

- The first component ($\{\overline{F(\widetilde{\alpha}_N^E X_{i,N}^A)} - \overline{F(\widetilde{\alpha}_N^A X_{i,N}^A)}\}$) is the difference in employment (over- and under-qualification) rates between Austrians and natives of other EU-countries that could be expected if the natives in the EU 13 had exactly the same characteristics as native Austrians and thus measures the differences in the parameters effect between natives in Austria and in other EU-countries.

- The second component ($\{\overline{F(\widetilde{\alpha}_N^E X_{i,N}^E)} - \overline{F(\widetilde{\alpha}_N^E X_{i,N}^A)}\}$) gives an estimate of the difference in employment (over-qualification and under-qualification) rates that would result if the Austrian natives had exactly the same parameters governing their employment (over- and under-qualification) rates as the natives in other EU-countries. It thus measures difference in characteristics effect between natives in the EU and Austria.

- The third component ($\{\overline{F\left(\widetilde{\alpha}_F^E X_{i,F}^A + \widetilde{\lambda}^E Z_{i,F}^A\right)} - \overline{F\left(\widetilde{\alpha}_F^A X_{i,F}^A + \widetilde{\lambda}^A Z_{i,F}^A\right)}\}$) gives the difference in employment (over- and under-qualification) rates of foreigners predicted if the foreign born residing in Austria had exactly the same characteristics as the foreign born residing in other EU-countries and is called the differences in the parameters effect between foreigners in Austria and the EU.

- The fourth component ($\{\overline{F\left(\widetilde{\alpha}_F^E X_{i,F}^E + \widetilde{\lambda}^E Z_{i,F}^E\right)} - \overline{F\left(\widetilde{\alpha}_F^E X_{i,F}^A + \widetilde{\lambda}^E Z_{i,F}^A\right)}\}$) finally gives the hypothetical difference in employment (over- under-qualification) rates resulting if the foreign born residing in Austria had exactly the same parameters governing their employment (over-

qualification and under-qualification) rates as the foreign born in the EU. It can be referred to as the difference in characteristics effect between foreigners in Austria and the EU.

Regression results

Summarizing thus the two decompositions in equations (4.6) and (4.7) can be derived from estimating four separate equations two for natives residing in the EU 13 and in Austria, respectively, and two for the foreign born residing in the EU and Austria. Tables 4.7 to 4.9 present the results of these regressions for employment, over- and under-qualification rates of the natives and foreign born. In these regressions both for natives as well as for foreign born we control for educational attainment, age groups as well as gender by a set of indicator variables which take on the value of one if the person under consideration has a low (ISCED 2 or lower), medium (ISCED 3 or 4) or high (ISCED 5 or higher) education level, is aged 15-24, 25-44 or 45 to 64 or is male or female, respectively. Furthermore, for the foreign born we also control for composition effects by a set of indicator variables that take on the value one if a member of a particular group of foreigners lives in the country of residence for more or less than ten years respectively, where the groups of foreigners considered are those born in the EU 15, the new member states of the EU (NMS 12), other European countries, Turkey, Africa, South and Southeast Asia and other Asian countries as well as America, Australia and Oceania (as one group).

In addition in these tables we report marginal effects (rather than coefficients) which are normalized in such a way that dummy variables measure the deviation of the respective group from the mean (see *Yun,* 2005, 2006 for details). This has the advantage that the numbers presented in the tables have the interpretation of measuring the percentage point change in the dependant variable as the respective independent (dummy) variable changes from zero to one (and all other variables are evaluated at the group mean) relative to the group average.

Employment probability

Moving first to the results with respect to employment rates (see table 4.7) we find a number of differences in the workings of the labour market both for natives as well as the foreign born between Austria and the EU 13. In particular when considering the impact of education on the employment rate both in Austria and the EU 13 employment probabilities increase with educational attainment. According to the results a native highly educated Austrian – all else equal – has a by 12.7 percentage points higher employment probability than the mean (of 72.2% for native Austrians), while the employment probability of a low skilled native Austrian is by 16.8 percentage points lower.

Table 4.7: Detailed regression results with respect to employment rates (2006 and 2007)

| | Foreign born | | | | | | Natives | | | | | | |
| | EU | | | Austria | | | EU | | | Austria | | |
	Coeff.		S.E.	Coeff.		S.E.	Coeff.		S.E.	Coeff.		S.E.
Low education	–0.100	***	0.005	–0.100	***	0.027	–0.154	***	0.002	–0.168	***	0.013
Medium education	0.014	***	0.005	0.010		0.023	0.022	***	0.002	0.011		0.010
High edication	0.082	***	0.005	0.085	***	0.029	0.122	***	0.002	0.127	***	0.011
Aged 15-24	–0.166	***	0.007	–0.056	*	0.032	–0.206	***	0.002	–0.090	***	0.012
Aged 25-44	0.131	***	0.005	0.127	***	0.023	0.169	***	0.002	0.161	***	0.009
Aged 45-64	0.028	***	0.006	–0.073	***	0.026	0.020	***	0.002	–0.083	***	0.009
Male	0.116	***	0.003	0.092	***	0.016	0.081	***	0.001	0.056	***	0.007
Female	–0.116	***	0.003	–0.092	***	0.016	–0.081	***	0.001	–0.056	***	0.007
Duration of stay >10 years												
EU 15	0.057	***	0.009	0.101	**	0.050						
NMS 12	0.040	***	0.021	0.061		0.049						
Other Europe	0.048	**	0.015	0.129	***	0.035						
Turkey	–0.113	***	0.025	0.030		0.052						
Africa	0.006		0.009	0.037		0.121						
Americas, Australia & Oceania	0.079	***	0.012	0.050		0.129						
South and Southeast Asia	0.022	*	0.013	0.132	*	0.079						
Other Asia	–0.004		0.020	0.086		0.096						
Duration of stay <10 years												
EU 15	–0.013		0.016	0.067		0.060						
NMS 12	0.133	***	0.011	–0.023		0.065						
other Europe	0.014		0.015	–0.081		0.057						
Turkey	–0.119	***	0.044	–0.140	*	0.086						
Africa	–0.101	***	0.012	–0.119		0.124						
Americas, Australia & Oceania	0.119	***	0.009	–0.055		0.146						
South and Southeast Asia	–0.041	**	0.017	–0.157		0.104						
Other Asia	–0.182	***	0.022	–0.190	*	0.112						
2006	–0.007	**	0.003	–0.011		0.016	–0.002		0.001	–0.007		0.007
2007	0.007	**	0.003	0.011		0.016	0.002		0.001	0.007		0.007
Nobs												
Pseudo_R2	0.111			0.095			0.137			0.135		
Log-Likely	–12,044.389			–565.3			–92,509			–2,346		

Source: EU-LFS, WIFO-calculations. – Notes: Table reports marginal effects of a probit model. *** (**) (*) – signify significance at the 1%, (5%), (10%) level respectively. S.E. = standard error of the estimate.

For natives residing in other EU-countries these marginal effects are almost the same for the high and low skilled. A low skilled native residing in the EU 13 has a by 15.4 percentage point lower employment probability than the mean (of 67.0% for natives residing in the EU), and for a highly educated native residing in another EU 13-country this probability is by 12.2 percentage points higher. The only difference with respect to skill differentials in employment rates of natives in Austria and the other EU 13-countries is that marginal effects for the medium education levels are slightly higher for natives residing in the EU 13 (who have a by 2.2 percentage point above average employment probability) than for Austrians (whose employment rate does not differ significantly from the average).

When, however comparing these results to those for foreign born residing in Austria or the other 13 EU-countries, respectively, we see that the increase in employment probabilities with educational attainment for foreigners is much flatter than for natives. According to our results an otherwise a highly educated foreign born living in other EU 13-countries has an employment probability that is only by 8.2 percentage points higher than the average (of 64.7%), while for a foreign born living in Austria this increase in the employment probability is 8.5 percentage points relative to the mean (of 64.2%). For the low skilled foreign born, by contrast, the decrease in employment probability is lower than for natives, since low skilled foreign born have a by 10 percentage point lower than average employment probability both in Austria and other EU-countries.

Thus as a first result we can conclude that while employment-education profiles are very similar in Austria and other EU-countries for natives and foreign born, the foreign born have flatter employment education profiles than natives in both regions. Thus consistent with our descriptive evidence in the last section native-foreign differentials are particularly pronounced at the upper end of the qualification spectrum both in Austria and the EU 13. In contrast to our descriptive results, however, marginal effects of the employment probability by skill levels are not substantially higher in Austria than in other EU 13-countries. This thus suggests that the stronger increase of the native-foreign employment rate differentials with skills in Austria found in the descriptive evidence is primarily due to differences in structure of migration between Austria and the EU.

Similar facts also apply when considering the impact of age on employment probabilities in the EU 13 and Austria. Here the most important differences apply to very different age-employment profiles, which are a reflection of the generally low integration of older workers in the Austrian labour market as well as differences in education systems for young workers. According to our results a native aged between 45 and 64 residing in Austria – after controlling for other influences – has an employment probability that is by 8.3 percentage points below the mean (of 72.2%), while in other EU-countries a native of the same age group has an employment probability that is by 3 percentage points higher than the mean (of 64.2%). At the same time young native workers (aged 15 to 24) in Austria have an employment probability that is by 9.0 percentage points lower than average, while in other EU 13-countries this difference is 20.6 percentage points.

These marked differences in age employment profiles between Austria and the EU, however, also apply to foreign born workers. Older foreign born workers in Austria have a by 7.3 percentage point below average employment probability (is 64.2%), while older foreign born workers residing in other EU 13-countries have an employment probability that is by 2.8 percentage points higher than average (of 64.7%). The young foreign born workers, by contrast, have a 5.6 percentage points below average probability of employment in Austria but a 16.6 percentage point lower employment probability, when they reside in another EU 13-country.

Thus our second finding is that although there are important differences in employment-age profiles between Austria and other EU-countries that can be explained by the differences in education systems and differences in the generosity of the pension system (in particular with respect to early retirement schemes) these differences apply both to natives and foreign born and coefficients of these two groups within a region, differ only marginally. The only difference here seems to be that the reduction in employment probability is somewhat lower for young foreign born workers than natives both in Austria and the EU. This can, however, be explained by lower participation rates in secondary and tertiary education of foreign born in both regions.

Gender differences in employment rates, by contrast, are smaller in Austria than in other EU 13-countries for both foreign born and natives. A female Austrian has an employment probability that – after controlling for other impacts – is by 5.6 percentage points lower than the average of 72.2%, while males have a 5.6 percentage point higher than average employment rate. For native females in other EU 13-countries this disadvantage is 8.1 percentage points relative to the mean of 67.0%. Similarly a foreign born female residing in Austria has an employment rate that is by 9.2 percentage points lower than the average (of 64.2%), while for a foreign born female residing in another country of the EU 13 this difference is 11.6 percentage points below the mean of 64.7%. Thus the impact of gender on employment probabilities is larger for the foreign born both in Austria as well as in the other EU 13-countries. Both in Austria and other EU 13-countries foreign born women are thus even more strongly disadvantaged with respect to employment rates than native born women.

In addition table 4.7 also provides evidence of substantial differences in employment rates between individual groups of foreigners, in particular in the other EU 13-countries. Here all groups of foreign born (except those born in Turkey and other Asian countries) that reside in their country of residence for more than 10 years have above average employment rates and these differences are significant for all groups except Africans. By contrast more recent migrants born in Turkey, Africa and other Asian countries have employment rates that are significantly (by more than 10 percentage points) below average, while more recent migrants from the NMS 12 and America, Australia and Oceania have significantly above average employment rates.

For foreign born residing in Austria, by contrast, dummy variables for individual migrant groups often remain insignificant despite large marginal effects. This suggests that the number of

observation is often too small to provide conclusive evidence of the differences between different groups of the migrant population. The only groups for which significant effects can be found are established migrants from the EU 15, other European countries and South and Southeast Asia, which all have significantly above average employment rates, while more recent migrants from Turkey and other Asian countries have significantly below average employment rates. Thus here too our descriptive results, which suggest significantly lower employment rates among migrants from the EU 27 are not corroborated by regression analysis, which implies that this difference between Austria and other EU 13-countries can also be explained by differences in the skill structure and duration of stay of migrants from these countries.

Over-qualification rates

Results with respect to over-qualification rates (in table 4.8) suggest that the probability of over-qualified employment strongly increases with educational attainment for all groups analysed. In particular highly skilled Austrians have a probability of over-qualified employment that is by 6.3 percentage points higher than the average of 8.7%, (and for medium skilled native Austrians accordingly it is by 6.3 percentage points lower than average). These effects are of a similar magnitude (6.7 percentage points) for the natives residing in other EU-countries, who have an average probability of over-qualified employment of 8.7%, but slightly higher for the foreign born residing in Austria (7.2 percentage points, relative to an average probability of 15.8%) and (9.0 percentage points relative to an average of 17.0%) for foreign born residing in other EU 13-countries. As with employment rates thus native-foreign born differentials in over-qualification increase with educational attainment, but here this tendency is stronger in other EU 13-countries than in Austria.

Results with respect to the impact of age on the probability of over-qualified employment, by contrast, suggest a much larger variance across the groups analysed. Among the natives in the EU the older (i.e those aged 45 to 64) have have over-qualification rates that are by 4 percentage points lower than the average of 8.9%, while the young (15 to 24 year olds) have over-qualification probabilities that are by 6 percentage points higher than average. For the foreign born in other EU 13-countries by contrast the probability of over-qualified employment is by 1.2 percentage points lower than the average (of 17.0%) in the medium age groups, while it is highest among the young. In Austria age has no significant impact on the probability of over-qualified employment. Thus while the age-over-qualification profiles differ substantially between natives and foreign born in other EU 13-countries, there is no significant correlation between age and the probability of over-qualified employment in Austria for both natives and foreign born.

Table 4.8: Detailed regression results with respect to over-qualification rates

| | Foreign born | | | | Natives | | | |
| | EU | | Austria | | EU | | Austria | |
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Medium education	−0.090 ***	0.005	−0.072 ***	0.025	−0.067 ***	0.001	−0.063 ***	0.007
High edication	0.090 ***	0.005	0.072 ***	0.025	0.067 ***	0.001	0.063 ***	0.007
Aged 15-24	0.025 **	0.012	−0.065	0.045	0.062 ***	0.003	−0.010	0.012
Aged 25-44	−0.016 **	0.007	0.024	0.032	−0.012 ***	0.002	−0.002	0.009
Aged 45-64	−0.009	0.009	0.048	0.040	−0.040 ***	0.002	0.012	0.009
Male	−0.037 ***	0.005	−0.057 ***	0.021	−0.007 ***	0.001	−0.008	0.006
Female	0.037 ***	0.005	0.057 ***	0.021	0.007 ***	0.001	0.008	0.006
Duration of stay >10 years								
EU 15	−0.141 **	0.011	−0.157 ***	0.040				
NMS 12	−0.011	0.026	−0.047	0.053				
Other Europe	−0.030	0.020	0.069	0.051				
Turkey	−0.058	0.040	0.032	0.102				
Africa	−0.071 ***	0.012	0.063	0.150				
Americas,Australia & Oceania	−0.101 ***	0.014	−0.112	0.101				
South and sotheast asia	−0.044 ***	0.017	−0.035	0.099				
Other Asia	−0.087 ***	0.021	−0.101	0.088				
Duration of stay <10 years								
EU 15	−0.132 ***	0.014	−0.149 ***	0.043				
NMS 12	0.221 ***	0.019	0.031	0.076				
Other Europe	0.188 ***	0.026	0.163 *	0.090				
Turkey	0.086	0.084	0.230	0.209				
Africa	0.115 ***	0.021	0.164	0.210				
Americas,Australia & Oceania	0.145 ***	0.016	−0.022	0.156				
South and sotheast asia	0.062 **	0.025	0.177	0.196				
Other Asia	0.038	0.036	−0.034	0.129				
2006	−0.002	0.005	0.002	0.020	−0.002	0.001	−0.002	0.006
2007	0.002	0.005	−0.002	0.020	0.002	0.001	0.002	0.006
Nobs								
Pseudo_R2	0.100		0.087		0.061		0.051	
Log-Likely	−4,599.214		−209.294		−27,905.644		−877.122	

Source: EU-LFS, WIFO-calculations. – Notes: Table reports marginal effects of a probit model. *** (**) (*) – signify significance at the 1%, (5%), (10%) level respectively. S.E. = standard error of the estimate.

By contrast, the impact of gender on the probability of over-qualified employment is very similar among Austrian natives and natives of other EU 13-countries, but slightly larger among the foreign born in Austria than among the foreign born in other EU 13-countries. The probability of over-qualified employment among female natives is by 0.8 percentage points higher than the average of 8.7% in Austria, while among native women in the EU 13 it is 0.7 percentage points higher than the average of 8.9%. For the foreign born women residing in Austria the over-qualification risk is by 5.7 percentage points above the average of 15.8%, while for foreign born women residing in other EU 13-countries this risk is 4.7 percentage points above the average of 17.0%. As with respect to employment rates also for over-qualification rates gender differences are larger for the foreign born than for natives both in Austria as well as in other EU 13-countries, but this tendency is more pronounced in Austria.

In addition our results also indicate significant differences in the probability of over-qualified employment among various groups of foreign born in Austria and other EU-countries. Here among the foreign born in Austria, those coming from other EU 15-countries have significantly (by between 15.7 and 14.9 percentage points) lower over-qualification rates than the average of 15.8%, irrespective of their duration of stay in Austria, while recent migrants coming from other European countries have significantly (by 16.3 percentage points) higher rates of over-qualification.

For the other EU 13-countries, however, effects are significant for a much larger number of groups on account of the larger number of observations provided. Here too migrants from other EU 15-countries have significantly (by 14.1 and 13.2 percentage points) lower over-qualification rates than the average foreign born, both when they have resided in their country of residence for 10 years or more and less than 10 years. In addition, however, also more established migrants from Africa, America, Australia and Oceania, South and Southeast Asia as well as from other Asian countries face probabilities of over-qualified employment that are significantly smaller than for the average foreign born. On the other hand more recent migrants from the NMS 12, other European countries, Africa, America, Austrailia and Oceania as well as from South and Southeast Asia have over-qualification rates that are significantly below the mean.

Furthermore in the estimates for foreign born residing in other EU 13-countries marginal effects for all foreigner groups that reside in a country for more than 10 years are negative and thus suggest below average over-qualification rates, while for all groups of recent foreign born except those coming from other EU 15-countries they are positive and thus imply above average over-qualification rates. For Austria by contrast such a clear indication of falling over-qualification rates with increased duration of stay is missing and both positive as well as negative marginal effects are found for established as well as more recent migrants. This thus corroborates the descriptive evidence, which also suggests a more sizeable reduction of over-qualification rates with duration of stay in other EU 13-countries than in Austria, and also points to particular problems of more established migrant groups in transferring formal education to Austria.

Under-qualification rates

When considering results for the probability of under-qualified employment (see table 4.9), we find that once more educational attainment has a substantial impact on the probability of under-qualified employment. For instance low skilled Austrians have a probability of under-qualified employment that is – all else equal - by 23.3 percentage points higher than for the average of 35.6%, (and accordingly for medium skilled Austrians this probability is by 23.3 percentage points lower). Marginal effects, however, are rather similar across the groups analysed. In particular for less educated natives in the EU the probability of under-qualified employment is 25.3 percentage points higher than the average (of 38.7%) and for the foreign born residing in Austria and other EU 13-countries the equivalent marginal effects are 20.6 and 22.0 percentage points relative to averages of 27.8% and 31.7%, respectively. Thus in contrast to our descriptive results education under-qualification profiles are only slightly flatter for the foreign born than for the natives both in the EU and in Austria, which once more suggests that the differences found in the descriptive analysis can primarily be explained by a different composition of the group of low skilled foreigners with respect to country of birth, duration of stay and potentially other variables.

The impact of age on under-qualification, by contrast, once more varies more strongly across groups. For Austrian natives age is not significantly correlated with the probability of under-qualified employment, while for natives residing in the EU 13 the probability of under-qualified employment is significantly increasing in age. Older (45 to 64 year) natives in the EU 13 have a probability of over-qualified employment that is by 7.5 percentage points higher than the average (of 38.7%). For younger natives in the other EU 13-countries this probability is by 11.8 percentage points lower. For foreign born both residing in Austria as well as in other EU 13-countries, by contrast, marginal effects are only significant for the young (15 to 24 year olds). The foreign born residing in Austria have a risk of under-qualified employment that is by 10 percentage points higher than in the average of 31.7%, but the risk of under-qualified employment for foreign born residing in other EU-countries is by 3.0 percentage points lower than for the average foreign born.

This thus suggests that age has a smaller impact on the under-qualification risk of the foreign born in Austria than in the EU 13, which may be a result of the dual education system in Austria, and that at least in the EU 13-countries age under-qualification profiles of the foreign born are flatter than for natives.

For gender differences in under-qualification rates the findings of larger gender differences among foreign born than among natives also apply. In addition here, however, gender differences – as with employment rates – are smaller in Austria than in the EU. Female Austrians have an under-qualification probability that is by 1.7 percentage points lower than the average of 35.6%, while for female natives of other EU 13-countries this probability is by 4.1 percentage points lower than the average of 38.7%. Similarly, for female foreign born residing in Austria the under-qualification probability is by 3.1 percentage points lower than the

average, but for foreign born females residing in other EU 13-countries it is by 6.7 percentage points lower.

Table 4.9: Detailed regression results with respect to under-qualification rates

| | Foreign born | | | | Natives | | | |
| | EU | | Austria | | EU | | Austria | |
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Low education	0.220 ***	0.005	0.206 ***	0.026	0.253 ***	0.002	0.233 ***	0.013
Medium education	−0.220 ***	0.005	−0.206 ***	0.026	−0.253 ***	0.002	−0.233 ***	0.013
Aged 15-24	−0.030 **	0.012	0.101 **	0.048	−0.118 ***	0.004	−0.007	0.018
Aged 25-44	0.008	0.008	−0.032	0.032	0.042 ***	0.003	0.006	0.014
Aged 45-64	0.022	0.010	−0.064	0.035	0.075 ***	0.003	0.001	0.015
Male	0.067 ***	0.005	0.031	0.023	0.041 ***	0.002	0.017	0.010
Female	−0.067 ***	0.005	−0.031	0.023	−0.041 ***	0.002	−0.017	0.010
Duration of stay >10 years								
EU 15	0.093 ***	0.016	0.245 ***	0.090				
NMS 12	−0.036	0.035	0.063	0.079				
Other Europe	0.008	0.023	−0.084	0.050				
Turkey	0.060	0.039	−0.067	0.067				
Africa	0.030 **	0.015	−0.058	0.173				
Americas,Australia & Oceania	0.080 ***	0.021	0.162	0.239				
South and sotheast asia	−0.001	0.022	0.000	0.128				
Other Asia	0.175 ***	0.034	0.271	0.166				
Duration of stay <10 years								
EU 15	0.144 ***	0.028	0.224 **	0.102				
NMS 12	−0.208 ***	0.016	0.019	0.097				
Other Europe	−0.085 ***	0.024	−0.191 ***	0.063				
Turkey	−0.031	0.067	−0.156 *	0.092				
Africa	−0.104 ***	0.018	−0.133	0.144				
Americas,Australia & Oceania	−0.132 ***	0.015	−0.048	0.222				
South and sotheast asia	−0.013	0.027	−0.103	0.134				
Other Asia	0.057	0.041	0.012	0.202				
2006	−0.001	0.005	0.004	0.022	−0.002	0.002	0.005	0.010
2007	0.001	0.005	−0.004	0.022	0.002	0.002	−0.005	0.010
Nobs								
Pseudo_R2	0.175		0.139		0.187		0.0891	
Log-Likely	−5,553.464		−275.144		−44,804.554		−1,689.8	

Source: EU-LFS, WIFO-calculations. – Notes: Table reports marginal effects of a probit model. *** (**) (*) – signify significance at the 1%, (5%), (10%) level respectively. S.E. = standard error of the estimate.

Finally, with respect to the country structure we once more find that marginal effects are much more often significant for foreign born residing in other EU 13-countries than for foreign born residing in Austria. In Austria only foreign born from other EU 15-countries that reside in Austria for more than 10 years or less than 10 years have significantly (by 24.5 percentage points and 22.4 percentage points) higher rates of under-qualification, while recent Turkish migrants as well as recent migrants born in other EU-countries have significantly lower rates of under-qualification than the average foreign born in Austria.

For foreign born residing in the other 13 EU-countries – in addition to foreigners born in other EU 15-countries – also more established migrants born in Africa, America, Australia and Oceania as well as in other Asian countries have significantly higher rates of under-qualification than the average foreign born, while more recent migrants from the NMS 12, other European countries, Africa and America, Australia and Oceania have significantly lower probabilities of under-qualified employment. Thus once more the link between duration of stay among the foreign born and under-qualification is closer in other countries of the EU 13 than in Austria.

Decomposition results

Results of a detailed regression analysis thus points to a number of differences in the impact of various determinants of employment, over- and under-qualification rates of natives and foreign born and also highlight some differences between foreign born residents of Austria and the other EU 13-countries. One of the drawbacks of this analysis is, however, that it allows no direct inference on the effects of individual variables on predicted probabilities and thus does not allow us to assess the importance of the various differences for overall differences in foreign native differentials. Thus in tables 4.10 and 4.11 we present the results of the decompositions of differences in the foreign-born native differentials in employment, over- and under-qualification rates between Austria and the EU based on equations (4.6) and (4.7). In addition to presenting the results of the aggregate decompositions, in this table we also list the contribution of various groups of variables (such as education, age, gender as well as country dummies by duration of stay) to the total differences explained by each of the components of the decomposition.[47]

As can be seen from table 4.10, where we report the results of the first decomposition (i.e. of applying equation 4.7 to the estimates reported in the last section) most of the differences in over- and under-qualification rates of the foreign born between Austria and the EU 13 can be attributed to the difference in characteristics effect between the foreign born in Austria and other EU 13-countries. This effect explains almost 6.1 percentage points of the total 9 percentage point difference in the under-qualification rate between the foreign born in other EU-countries and Austria, while it contributes 1.3 percentage points to the 2.4 percentage

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[47] In calculating these contributions and their standard deviations we follow the methods proposed in *Yun* (2005).

point difference in over-qualification rates among foreign born in other EU 13-countries and Austria. In addition both these contributions are statistically significant.

Table 4.10: Decomposition results according to equation 4.7

	Employment rate		Over-qualification rate		Under-qualification rate	
	Effect	S,E	Effect	S,E	Effect	S,E
Total	**–0.05873** ***		**0.00387**		**0.01826**	
Foreign born EU-AT	**0.00521**		**0.02407**		**0.08954** **	
Characteristics	*–0.01885* ***	*0.00513*	*0.01337* ***	*0.00652*	*0.06098* ***	*0.00775*
- Education	0.00174	0.01115	0.02171	0.06033	0.02717 ***	0.00748
- Age	0.00612	0.00437	–0.00224	0.01691	0.00006	0.00231
- Gender	0.00182	0.00147	0.00309	0.01047	0.00122	0.00220
- Country long	–0.01850	0.03469	–0.02172	0.10735	0.03876	0.04426
- Country short	–0.01047	0.01977	0.01265	0.05714	–0.00609	0.03048
- Year	0.00045	0.00295	–0.00013	0.01325	–0.00014	0.00216
Parameters	*0.02299*	*0.03094*	*0.01086*	*0.04208*	*0.02525*	*0.04960*
- Education	0.00039	0.01384	–0.00245	0.02230	0.00003	0.01914
- Age	0.01771	0.04528	–0.02358	0.07063	0.02727	0.09153
- Gender	–0.00066	0.02340	–0.00057	0.03876	–0.00076	0.04972
- Country long	–0.02438	0.02254	–0.01022	0.05317	–0.00700	0.08658
- Country short	0.03457	0.04412	0.02140	0.07964	–0.01139	0.05577
- Year	–0.00020	0.01047	0.00016	0.01333	0.00024	0.01748
- Constant	–0.00444	0.12390	0.02613	0.18348	0.01686	0.09611
Native EU-AT	**–0.05351** ***	**0.00723**	**0.02794** ***	**0.00632**	**0.10780** ***	**0.00961**
Characteristics	*–0.01916* ***	*0.00050*	*0.02479* ***	*0.00052*	*0.10800* ***	*0.00079*
- Education	–0.02026	0.01056	0.02637	0.00100	0.10734	0.00248
- Age	0.00103	0.00041	–0.00102	0.00072	–0.00003	0.00046
- Gender	0.00006	0.00002	–0.00059	0.00029	0.00069 **	0.00028
- Year	0.00001	0.00003	0.00002	0.00004	0.00001	0.00001
Parameters	*–0.03430* ***	*0.00751*	*0.00317*	*0.00797*	*–0.00795*	*0.01010*
- Education	0.00371	0.00568	0.00009	0.00746	0.00063	0.05109
- Age	0.01498 **	0.00807	–0.01973	0.10105	0.02911	0.12997
- Gender	0.00009	0.00435	–0.00021	0.05673	0.00062	0.05376
- Year	0.00000	0.00397	0.00000	0.00687	–0.00003	0.01788
- Constant	–0.05308	0.17402	0.02304	0.14616	–0.03828	0.15884

Source: EU-LFS, WIFO-calculation. – Notes: Table reports marginal effects of a probit model. *** (**) (*) – signify significance at the 1%, (5%), (10%) level respectively. S.E. = standard error of the estimate.

The contribution of the difference in parameters effect between foreign born residing in the EU 13 and Austria to total differences in over- and under-qualification rates of the foreign

born residing in these regions, by contrast, remains statistically insignificant and contributes only 2.5 percentage points to total differences in under-qualification rates of the foreign born in the EU and Austria and 1.1 percentage points to total differences in over-qualification rates among these two groups. This thus suggests that the statistically significant contributions to total differences in over- and under-qualification rates of the foreign born in the EU 13 and Austria, can be attributed primarily to the differences in characteristics of the foreign born in the two regions.

Furthermore when considering individual groups of variables which contribute most substantially to these differences in characteristics effects, we find that for under-qualification rates differences in the education structure of the foreign born in Austria and the EU contribute (statistically significantly) 2.7 percentage points to the total difference in characteristics of the foreign born in Austria and the EU 13, while differences in the structure of long term migrants contribute a statistically insignificant 3.9 percentage points. For over-qualification rates by contrast the contribution of all groups of individual variables remains insignificant, but once more the differences in education structure (with 2.2 percentage points) and differences in the country structure of more recent migrants contribute most to the total difference in characteristics effect between the foreign born in the EU 13 and Austria.

The situation is somewhat different with respect to employment rates, however. Here the difference in characteristics effect between the foreign born in the EU and Austria suggests that employment rates among the foreign born in Austria should actually be (statistically significantly) by 1.9 percentage points higher than in the other EU 13-countries if the parameters governing employment probabilities were equal across both regions, with the majority of this effect being attributable to differences in the country structure of long term and more recent migrants in Austria.

More than the total difference (of 0.5 percentage points) in employment rates of the foreign born in the EU 13 and Austria is thus explained by the insignificant differences in parameters effect. In total this suggests that employment rates of the foreign born would be by 2.3 percentage points higher in the EU than in Austria if the foreign born residing in these two regions shared the same characteristics. Although these differences remain statistically insignificant they suggest that the majority of this effect stems from differences in parameters with respect to employment rates of migrants of different age groups (which contributes a total of 1.8 percentage points to the total difference in parameters effect) and of recent migrants to Austria (which contributes almost 3.5 percentage points to this difference). The lower employment rates of the foreign born in Austria than in the other EU 13-countries can thus be more than fully accounted for by differences in the parameters among the foreign born in Austria, with in particular different age-employment rate profiles in Austria and differences in the parameters of recent migrant groups contributing most strongly to this difference in parameters effect.

Similar stylized facts also apply to the differences in employment, over- and under-qualification rates among the natives in Austria and other EU 13-countries. Here, as for foreigners, the majority of the differences in the over- and under-qualification rates among natives between the EU and Austria can be attributed to differences in characteristics. In total the difference in characteristics effect contributes more than the total 10.8 percentage point difference in under-qualification rates of natives between the EU and Austria and 2.5 percentage points to the total 2.8 percentage points differences in over-qualification rates between natives in the EU and Austria. In addition - as for differences for foreign born - the majority of this difference in characteristics can be attributed to differences in educational structure between the natives in Austria and the EU. These differences contribute 10.7 percentage points to the total difference in characteristics effect for under-qualification rates, and 2.6 percentage points to the total difference in characteristics effect with respect to over-qualification rates.

As for the foreign born this similarity does, however, not apply to employment rates. Here the differences in parameters effect contributes 3.4 percentage points to the in total by 5.4 percentage points higher employment rates of natives in Austria than in the EU, while the difference in characteristics effect contributes 1.9 percentage points to this difference.[48]

Considering the second decomposition where we focus on differences between natives and foreign born (see table 4.11) in the EU and Austria, we find that for employment rates these differences can be fully explained by the difference in parameters effect between natives and foreign born. According to the results if the parameters governing the employment rates of the foreign born and natives were the same the employment rates of the foreign born in the EU should be by 3.8 percentage points higher than that of natives in the EU 13, and in Austria the employment rate of the foreign born should be by 4.0 percentage points higher. Thus with respect to employment rates the characteristics effect points to a higher employment rate of the foreign born than the natives in both regions. The native-foreign differentials in employment rates are thus fully accounted for by the differences in the parameters of natives and foreign born.

Similarly for over-qualification rates the difference in characteristics effect between natives and foreign born residing in the EU implies that over-qualification rates should actually be by 0.2 percentage points higher among the foreign born than among natives residing in the EU 13. Once more differences in parameters more than the completely explain differences between natives and foreign born in over-qualification rates in other EU 13-countries. In Austria the difference in characteristics effect between natives and the foreign born suggests a 0.9 percentage point higher over-qualification rate among foreign born than among natives if characteristics were equal across these two groups. The contribution of this effect to total native foreign-native differences of 12.8 percentage points is, however, only minor.

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[48] A further analysis of the causes fort his differences, however, remains inconclusive because the total difference in parameters effect arises through the difference in the constant term in the regressions fort hese two groups and can thus not be explained further.

Once more the majority of the total differences (12.0 percentage points) are explained by differences in parameters between the foreign born and natives.

Table 4.11: Decomposition results according to equation 4.6

	Employment rate			Over-qualification Rate			Under-qualification rate		
	Effect		S.E	Effect		S.E	Effect		S.E
Total	**–0.0573**			**0.0023**			**0.0189**		
EU									
Native - foreign born	0.0219			–0.1261			0.1068		
Characteristics	–0.0384	***	0.0003	0.0024	***	0.0004	0.0063	***	0.0004
Education	–0.0005	***	0.0000	0.0004	***	0.0001	–0.0042	***	0.0007
Age	–0.0176	***	0.0011	0.0002		0.0006	0.0003		0.0039
Gender	0.0039	***	0.0002	0.0002		0.0001	–0.0002	**	0.0001
Year	–0.0003		0.0176	0.0000		0.0193	0.0000		0.0398
Country structure (established)	–0.0155	***	0.0030	0.0087		0.0022	–0.0136	**	0.0072
Country structure(recent)	–0.0085	***	0.0024	–0.0070	***	0.0035	0.0240	***	0.0047
Parameters	0.0604	***	0.0044	–0.1285	***	0.0053	0.1005	***	0.0069
Education	–0.0069	***	0.0029	–0.0020		0.0031	–0.0039		0.0035
Age	0.0093	***	0.0032	–0.0110	***	0.0047	0.0210	***	0.0056
Gender	–0.0002		0.0025	0.0013		0.0030	–0.0035		0.0035
Year	0.0000		0.0550	0.0000		0.0634	0.0000		0.0683
Constant	0.0581	***	0.0125	–0.1168	***	0.0176	0.0869	***	0.0194
Austria									
Native - foreign born	0.0792			–0.1284			0.0879		
Characteristics	–0.0399	***	0.0033	–0.0089	***	0.0013	–0.0531	***	0.0052
Education	0.0123		0.0101	0.0049		0.0093	–0.0834	***	0.0200
Age	–0.0142	***	0.0050	0.0038		0.0069	0.0044		0.0074
Gender	0.0047	**	0.0019	0.0023		0.0010	–0.0004		0.0006
Year	–0.0002		0.0277	–0.0010		0.0293	0.0001		0.0477
Country structure (established)	–0.0590	***	0.0192	–0.0021		0.0554	0.0103		0.0375
Country structure(recent)	0.0165	*	0.0106	0.0010		0.0247	0.0160		0.0152
Parameters	0.1191	***	0.0217	–0.1195	***	0.0211	0.1410	***	0.0408
Education	–0.0043		0.0152	–0.0119		0.0192	–0.0067		0.0204
Age	0.0097		0.0138	–0.0147		0.0215	0.0209		0.0242
Gender	–0.0001		0.0106	0.0074		0.0156	–0.0009		0.0161
Year	0.0001		0.1196	0.0001		0.1338	0.0001		0.1485
Constant	0.1137	**	0.0582	–0.1003	*	0.0694	0.1277		0.1039

Source: EU-LFS, WIFO-calculations. – Notes: Table reports marginal effects of a probit model. *** (**) (*) – signify significance at the 1%, (5%), (10%) level respectively. S.E. = standard error of the estimate.

In addition also for the under-qualification rates the differences in parameters effect contributes 10.1 percentage points to the total 10.6 percentage point difference in under-qualification rates between natives and foreigners in other EU 13-countries, while differences in characteristics effect between the foreign born and natives in the EU 13 accounts for only 0.6 percentage points of the total differences. In Austria by contrast the difference in characteristics effect suggests that if parameters governing the probability of under-qualified employment were the same for the foreign born as for the natives, under-qualification rates would be substantially (by 5.3 percentage points) higher among the foreign born than among the natives, while differences in parameters contribute to a total difference in under-qualification rates of 14.1 percentage points. This thus suggests that in particular the differences in education structure between natives (which account for more than the total difference in characteristics effect) in Austria would lead one to expect higher under-qualification rates than among natives and that the differences in parameters between natives and foreigners account for an even larger part of the native-foreign born differential in under-qualification rates in Austria than in the EU.

When, however, moving to the contribution of individual variables to the sizeable differences in parameters effect we find that for all indicators in both regions, the largest part of the difference in parameters effect is attributable to the differences in the constant in the estimated equations.

4.4 Summary and conclusions

In this chapter we set out to answer three questions. First, we wanted to know whether significant differences exist between Austria and the remaining EU 13-countries with respect to employment, over- and under-qualification rates of the foreign born relative to natives. Second we wanted to know whether the causes for such differences can be explained by differences in the characteristics of the foreign born in terms of their education, country of birth, duration of stay, age and gender. Third we wanted to know what are the most important differences in the determinants of successful labour market integration between the Austria and the other EU 13-countries.

With respect to the first question we find that while there are clear signs of foreigners being disadvantaged relative to natives in terms of employment as well as over- and under-qualification rates both in Austria and the EU 13, these differences between natives and foreigners are larger in Austria than in other EU-countries only with respect to employment rates. This is, however, primarily due to higher employment rates among natives in Austria than in other EU-countries, rather than to lower employment rates among foreigners; The employment rate among natives was 72.2% in Austria in the average of the years 2006 and 2007 and thus (significantly) by 5.2 percentage points higher than in the average of EU 13-countries, while the employment rate of the foreign born, by was 64.2% and thus 0.5 percentage points (and statistically insignificantly) lower than in the average of the EU 13.

Furthermore we also find that significant differences between the foreign born residing in Austria and those residing in other EU-countries exist only with respect to under-qualification rates. Among the EU 13-countries Austria is a country with about average over-qualification rates among natives and slightly below average over-qualification rates among the foreign born. Thus also the native-foreign differentials in over-qualification are slightly lower in Austria than in the EU 13 average. By contrast rates of under-qualification (with 35.6% for native and 27.8% for foreign born) are substantially below the EU 13 average for both natives and foreign born so that the foreign-native differential in this respect is only slightly (and statistically insignificantly) higher than the EU 13 average.

From a policy perspective these results thus suggest that on the one hand policies aiming at increasing employment rates among the foreign born in Austria are even more important than in other EU-countries, since this is the indicator where differences to other EU-countries are largest. On the other hand policies aiming at improving skill transfer (both with respect to formal and informal skills) seem to be of an equal importance as in other EU-countries, since here problems (both with respect to over- and under-qualification) are of a more comparable magnitude.[49]

With respect to the second question we find that the majority of the differences in employment over- and under-qualification rates between foreign born residing in Austria and other EU 13-countries can be explained by significant differences in characteristics between the foreign born residing in Austria and in other EU 13-countries. In particular the marked differences in the education and country structure of the foreign born contribute strongly. Thus after controlling for differences in migrant characteristics the foreign born in Austria are neither better nor worse integrated into the labour market than in the average EU 13-country. This points to the important role of migration policy in securing an adequate labour market integration of the foreign born. A higher selectivity of migration policy could also contribute to reducing problems of integration of the foreign born. Here in particular attracting more highly skilled migrants and (potentially also shifting the country structure of migrants) could contribute to reducing foreign-native differential in employment as well as over- and under-qualification rates.

Despite this indication of the importance of migration policy we also find, large differences – that cannot be explained by differences in demographic structure – in all indicators between natives and foreigners both in Austria and the EU. Here our results suggest that both in the EU 13 as well as in Austria, consistently for all indicators, foreigners have characteristics that – if they were treated in the same way as natives on national labour markets – would suggest much smaller (or in the case of employment and under-qualification rates even oppositely

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[49] We would, however, also argue that the low under-qualification rates which signal a lower importance of learning on the job effects for careers in Austria than in the EU 13, which are a general feature of the Austrian labor market shared by natives and foreigners, can be explained by the particularities of the Austrian education system, such as the apprentice system.

signed) native-foreign differentials. This thus points to the continuing importance of integration policies with respect to improving labour market integration policies.

With respect to these integration policies our regression results point to a number of general tendencies in the differences in parameters governing labour market integration between natives and foreigners that could indicate priorities for such policies. In particular for both Austria and the EU 12 our findings suggest that

- educational attainment (and to a lesser degree age) has a stronger impact on the respective probabilities of employment as well as over- and under-qualified employment for natives than for foreigners. Native-foreign differences are thus particularly pronounced among the more qualified. While Austria only differs marginally from other EU 13-countries in this respect, this points to the particular problems of skill transfer of highly skilled foreign born workers in European labour markets.

- native-foreign differentials are more pronounced for females than for males (or equivalently gender differences are more pronounced among foreign born) with respect to all indicators, thus indicating particular disadvantages of foreign born females. Here with respect to employment and under-qualification rates gender differences are lower in Austria both for natives and foreign born than in the rest of the EU, while they are larger than in the rest of the EU for the foreign born in Austria with respect to over-qualification.

- the foreign born in other EU 15-countries are somewhat of a special group, since their employment rates and even more strongly their over-qualification rates are significantly lower and higher with respect to under-qualification than for the average foreign born. This thus indicates that skill transfer across borders within the EU is significantly easier than transferring these skills from countries outside the EU and in consequence provides evidence of the high level of labour market integration among the EU 15. At the same time this does, however, not apply to those born in the member states of the EU that joined since 2004 (i.e the NMS 12) and thus suggests that with respect to these countries there is still some room to improve the mutual acceptance of skills and degrees.

In addition the regression results also point to some areas in which Austria and other EU-countries differ with respect to integration of the foreign born. In particular here our results suggest marked differences in employment rates by age groups between the EU 13 and Austria both for natives as well as foreign born. In Austria the young have substantially higher employment rates than in other EU-countries but the old have substantially lower ones.In addition with respect to over-qualification rates a longer duration of stay improves labour market integration of almost all groups of foreign born in the EU 13, but this does not apply as unambiguously to foreign born residing in Austria. This thus indicates particular problems of guaranteeing the transfer of qualifications for more established foreign born in Austria.

5. The Effects of Policy

5.1 Introduction

One of the consequences of the massive increase in the number of foreign born in Austria since the 1990s was an intensive public debate on appropriate migration and integration policies which also resulted in repeated and intensive policy changes. In particular three important reforms mark the history of migration policy in Austria in this time period. These were the introduction of a foreigner law and a residence law in 1993 ("Fremdengesetz", "Aufenthaltsgesetz") regulating entry, stay and residence of foreigners in Austria (see Biffl, 2007), the accession to the European Economic Area (EEA) in 1994, which liberalized immigration and labour market access from all member states of the EEA, and the integration agreement regulation which entered into force on 1ˢᵗ of January 2003 ("Fremdengesetz-novelle") and aimed at increasing the share of highly skilled foreign workers from third countries to Austria and effectively resulted in restricting permanent residence titles only to highly skilled foreign born workers.

Of these reforms in particular the experience of accession to the EEA and the integration agreement regulation in 2003 may also be of a wider policy interest in the light of future challenges to the Austrian migration regime and in the light of recent trends in international migration policy. In particular in 2011 Austria will liberalize labour market access to citizen of the new member states of the European Union. The accession to the EEA – although it concerned a set of countries that differ substantially from the new member states in terms of structure and wealth - thus represents a valuable historical example against which the potential effects of liberalization of labour market access for the new member states can be assessed. Furthermore a number of EU-countries have recently put in place policies that are intended to increase the share of highly skilled migrants (see OECD, 2008 for an overview of these policies) and migration experts (e.g Chiswick, 2005, Borjas, 1999) have long argued that developed countries should aim to attract more highly skilled migrants. The effectiveness of previous reforms, however, has rarely been formally evaluated in the economic literature and only very little is known about the issue of which policy measures are most likely to contribute to a higher selectivity of migration regimes. Thus the experiences of the integration agreement regulation in 2003 may serve as one benchmark case for future reforms of migration law both in Austria as well as in other countries.

Aside from this these reforms of the migration regime in the time period since 1990, may have had rather different impacts on the skill structure of migrants from a theoretical perspective. The integration agreement regulation in 2003 was clearly designed to increase the number of highly skilled permanent migrants from third countries to Austria, and should thus have moved the skill structure of permanent migration from third countries (relative to that from other EEA countries) to the highly skilled. The liberalization of migration and labour market access in 1994, by contrast, was a byproduct of Austria's membership in the EEA and thus could have worked both in the direction of increasing the share of highly skilled (if the restrictions to

migration prior from EEA to 1994 tended to favor low skilled migrants) as well as reducing the share of highly skilled (if these restrictions favored the high skilled).

In this chapter we thus ask how these two reforms (i.e. accession to the EEA in 1994 and the integration agreement regulation in 2003) impacted on the skill-structure of migrants in Austria. We use the fact that since accession to the EEA on the 1st of January 1994, applied to migrants from countries which are not member states of the EEA (so called third country migrants) and the integration agreement regulation only applied to third country migrants. Thus only migrants from EEA member states were affected by the accession of Austria to the EEA, while third country citizens were not and the opposite is the case for the integration agreement regulation in 2003. This allows us to use standard difference-in-difference estimation techniques (see *Angrist - Krueger, 1999, Card, 1990, Meyer, 1995*) to evaluate the impact of migration policy changes on the skill structure of migration.

The remainder of this chapter is organized as follows: The next section provides some institutional background on the development of migration policy since the early 1990's in Austria, while section 3 describes the data set used for our analysis. Section 4 then describes our method, section 5 presents results and section 6 discusses robustness issues. In section 7 we summarise our most important findings and discuss their relevance for future policy changes.

## 5.2   Institutional Background: Migration law in Austria 1990-2004

When the Iron Curtain came down in 1989, this marked the end of the traditional Austrian migration policy, which was based on a temporary foreign worker model ("Gastarbeiter-modell"). New groups of migrant workers came to Austria - from Middle and Eastern Europe and from other parts of the world. Additionally, as a result of the civil war in Former Yugoslavia, a large number of refugees moved to Austria. In this time the inflow of foreign born to Austria increased notably – in only a few years (1989-1992) the foreign population in Austria grew from 4.5% (1989) to 7% (1992) of total population. As a consequence of the increase in migration flows, migration rules were tightened in the beginning of the 1990s – beginning with an amended Foreign Worker Law in 1990. According to this amendment, the share of foreign labour force on the Austrian labour market was limited to 10% and reduced twice in 1993, first to 9% and later to 8%. Additionally, the number of foreign workers in agriculture and tourisms was limited by quota in 1994 ("Beschäftigungskontingent").

In addition to the amended Foreign Worker Law in 1993, Alien Law ("Fremdengesetz") and Residence Law ("Aufenthaltsgesetz") came into force. The latter regulated the first entry, stay and residence of foreigners and restricted the number of people, to settle in Austria through quotas. According to these laws from 1993 onwards governors of the federal states together with ministries (interior, labour) fixed the number of residence quotas[50] on an annual basis by

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[50] These quota did not replace quota for labour market access, but co-exist with those for labor market access.

region[51]. Differences by residence status in each region came into force in 1996 with quotas differentiated by family reunion, employment and private persons. In addition, special rules excluded some migrant groups (such as some family members or some groups of migrant workers)[52] or asylum seekers from quota regulation.

Figure 5.1: Migration flows by nationality in Austria (1981-2008)
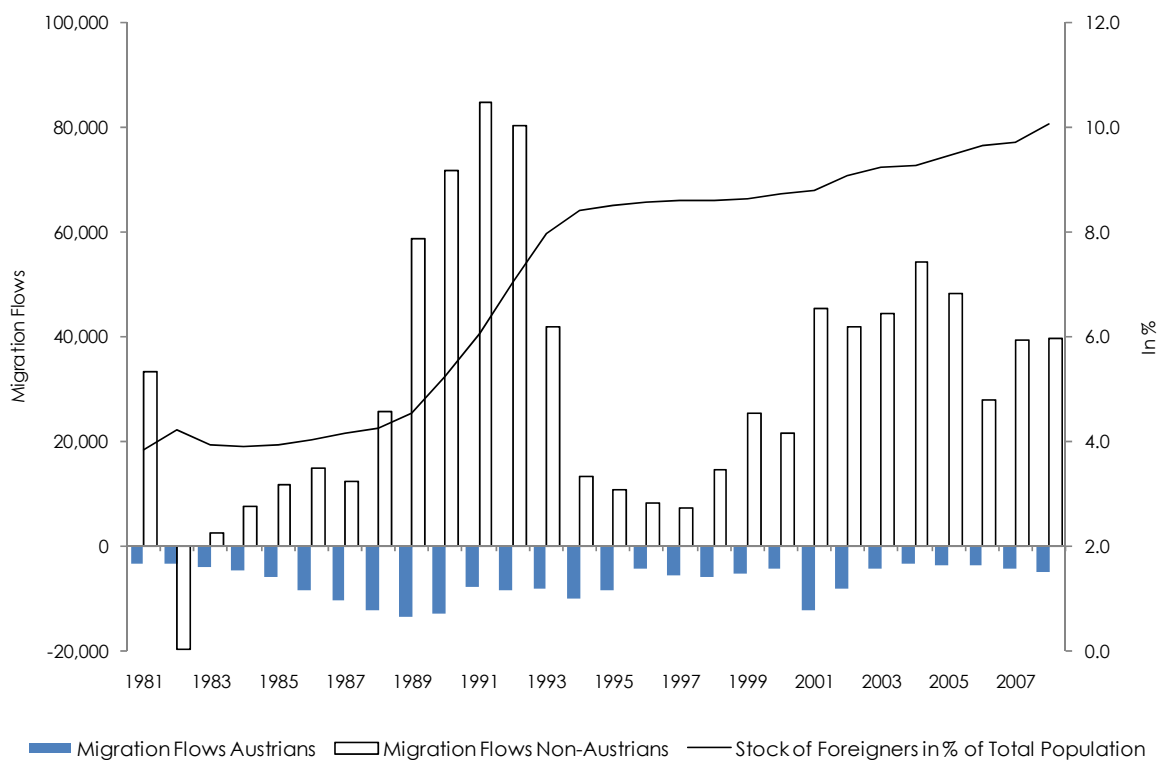
Source: Statistics Austria, WIFO-calculations.

In 1994, Austria joined the European Economic Area (EEA) which liberalized immigration and labour market access from all member states of the EEA. Since that time EEA-citizens are excluded from all quota and labour market regulations in Austria. Only non-EEA-citizens are restricted by residence quotas when coming to Austria from abroad and need work permits for labour market access – with continuing exceptions for some groups of foreigners and foreign workers from non EEA-countries. Total foreign population amounted to 669,453 in 1994;

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[51] Migrants were required to apply for an immigration visa from abroad.

[52] The composition of migrant groups without any quota regulation changed in 1997, when in addition special rules for instance for commuters, students, foreign employment outside the Foreign Worker Law regulation, artists, intercompany transferees and persons working for foreign media were enacted.

total foreign employment was total 291,018 in 1994, with 6.6% of foreign workers coming from EEA-countries[53].

Table 5.1: Annual quota and first time permit for residence migration

	1998	1999	2000	2001	2002	2003	2004	2005
				Quota (in persons)				
Total	8,540	9,565	7,860	8,338	8,280	8,070	8,050	7,500
Of which:								
Family reunion	4,550	5,210	5,000	5,490	5,490	5,490	5,490	5,460
Employment	950	1,120	1,000	815	495			
Key employment	1,860	1,130	1,010	1,613	1,905	2,405	2,200	1,600
Private persons	630	660	490	420	390	175	360	440
				Permits granted				
First settlement permits by quota						8,027	5,138	6,258
First settlement permits outside quota						26,537	26,697	25,908

Source: Federal Ministry of the Interior ("Niederlassungsverordnung").

Table 5.2: Chronology of migration law in Austria

Year	Law
1975	Foreign Worker Law ("Ausländerbeschäftigungsgesetz 1975")
1988	Amendment of Foreign Worker Law
1990	Alien Police Law (Fremdenpolizeigesetz)
	Amendment of Foreign Worker Law
1993	• Alien Law ("Fremdengesetz") • Residence Law ("Aufenthaltsgesetz")
	Amendment of Foreign Worker Law
1994	EEA accession
1995	Amendment of Residence Law
1998	Alien Law 2003 ("Fremdengesetz 1997")
2003	Alien Law 2002 (Amendment of Alien Law 1997)
2006	Alien Police Law ("Fremdenpolizeigesetz 2005") Residence and Settlement Law ("Niederlassungs- und Aufenthaltsgesetz 2005")

Source: WIFO-research.

In August 1997 a new legislation regulating residence and settlement of persons of third country origin was passed and came into effect in 1998. The new legislation – Austrian Aliens' Law ("Fremdengesetz 1997") – regulated short stays and long-term residence of persons from third countries and was intended to facilitate integration of family members, who had arrived before 1992, into the labour market, with quota remaining largely unaffected.

On July 9, 2002, Alien Law and Residence Law were revised in a comprehensive way and entered into force on January 1, 2003. According to the amended Alien Law, the long-term immigration of unskilled workers of third country origin was not possible anymore. Permanent

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[53] The number of restricted foreign workers ("Bewilligungspflichtig beschäftigte ausländische Arbeitskräfte" by Austrian Labour Market Service) amounted to 268,843.

inflows were restricted to highly skilled employed and self-employed workers from third countries. Thus, the annual quota for long-term immigration from now contained quotas for family reunion, highly skilled employed, highly skilled self-employed and private persons. The total quota amounted to 8,070 in 2003 with 2,185 positions for highly skilled employed and 220 for highly skilled self-employed. The number of persons of third country origin, who could settle in Austria outside the quota regulations, contained partners and family members of Austrians and EEA-citizens, who are third country citizens, persons working for foreign media, self employed persons, private persons, who do not intend to work in Austria, artists and foreign workers with free labour market access (as defined in the Foreign Worker Law i.e. EEA citizen) or settlers on humanitarian grounds[54]. The total number of first settlement permits for foreigners of third country origin outside the quota amounted to 26,537 in 2003[55] and the share of first time settlement permits under the quota system never exceeded 1/3 of total granted permits in the time period until 2005.

Table 5.3: Annual quota for contingent work- and "Erntehelfer"-permits

	Contingent work permits	"Erntehelfer"-permits
2003	8.000	7.000
2004	8.000	7.000
2005	8.000	7.000
2006	7.500	7.000
2007	7.500	7.000
2008	7.500	7.000
2009	8.000	7.500

Source: "Niederlassungsverordnung".

At the same time the short-time, contingent work was restricted by a maximum number of initial work permits. Contingent work permits are in force not exceeding six months and can be extended for another six months at most. After this contingent workers have to leave Austria after one year of employment for two months. The number of initial work permits for contingent foreign workers of third country origin amounted to 8,000 in 2003. This temporary residence status doesn't allow residence and family reunion. The new number of initial work permits for "Erntehelfer", who are allowed to work in the agricultural sector for a maximum of 6 weeks, amounted to 7,000 for the first time in 2003.

In sum, the inflow of foreign workers and residents from countries outside the EEA/EU to Austria has been increasingly difficult since the early 1990s. In 2003, long-term immigration of foreign workers was limited to highly skilled. In 2005, the legislation regarding foreigners was revised fundamentally, affecting the regulation of residence and settlement ("Niederlassungs- und Aufenthaltsgesetz"), Alien Police Law ("Fremdenpolizeigesetz") und asylum seekers

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[54] The amended Foreign Worker Law ("Ausländerbeschäftigungsgesetz") allowed executives, researchers, scientists of third country origin free access to the labour market.

[55] See statistics of the Ministry of the Interior for more detail

("Asylgesetz") and came into force on January 1, 2006. The legislation was aligned with existing EU guidelines (for more details see *Biffl, 2007*).Hence, the annual quota for long-term immigration, which contained quotas for family reunion, highly skilled employed, highly skilled self-employed and private persons, was enhanced by quotas for permanent residents of third country origin in another EU-country (employed, self-employed, private persons) and for transferred permits ("Zweckänderungen"). Highly skilled migrants were still committed to fulfill the various requirements. Additionally, family reunion was hampered by income requirements. New residence permits outside the quota were restricted to family members and new settlers of third country origin with no or limited labour market access.

5.3 Data and stylised facts

Data Construction and Sample

The data we use to evaluate the impact of the two major changes in migration policy in Austria since 1994 is taken from a pooled sample of the Austrian Labour Force Survey of the years 2004 to 2007. In this representative quarterly survey of around 20,000 Austrian households the interviewed are asked on a number of personal characteristics (such as age, gender, educational attainment level and employment status) as well as on their country of birth and their year of immigration to Austria. Thus from this data it is possible to calculate the number of persons that migrated to Austria (and still reside in Austria) from a particular region in a particular year. Our data are thus well suited to evaluate the effects of migration policy on the skill structure of permanent migrants, since they provide information both on the year of migration and region of emigration as well as ample information on personal characteristics for this group. Despite this a number of caveats still exist.

The first limitation of the data is that, by its nature, we can only focus on migrants that were still residing in Austria in the time period from 2004 to 2007 and thus only focus on permanent (or at least long term) migration. This, however, arguably is also the group of migrants most relevant, since at least policy changes in 2003 were explicitly directed at persons with permanent settlement intentions and because among all migrant groups permanent migrants are also most likely to have the largest impact on the human capital endowment of their host country.

The second caveat stems from the fact that the 1990s aside from being a period of substantial institutional change in migration policy, were also particularly turbulent in terms of migration to Austria. In these years the civil war in former Yugoslavia led to a massive increase in the number of Yugoslav refugees to Austria (see Figure 5.2). This leads us to exclude all migrants born in former Yugoslav Republics form our data out of a concern that this influx of refugees may have differed substantially from other migration flows (in particular "Gastarbeiterzuwanderung" in den late 1960s and early 1970s) in terms of skill structure.

In addition political developments in the home country may lead to distortions with respect to the skill structure of migrants from developing and less developed countries. Thus for our

benchmark results we focus on migrants that settled in Austria in the years between 1988 and 2005 and compare migration flows to Austria from the EEA and other developed countries (excluding former Yugoslavia)[56], which may be expected to have been politically stable in the time period considered. To check for the robustness of our results we, however, also perform a parallel analysis in which we compare EEA migrants in the period 1988 to 2005 to migrants from all other countries (including less developed countries but excluding Yugoslavia). In addition in our robustness section we also restrict our sample to migrants that settled in Austria in the time period 1991 to 2005.

Figure 5.2: Foreign born residents in Austria by year of migration and region of birth
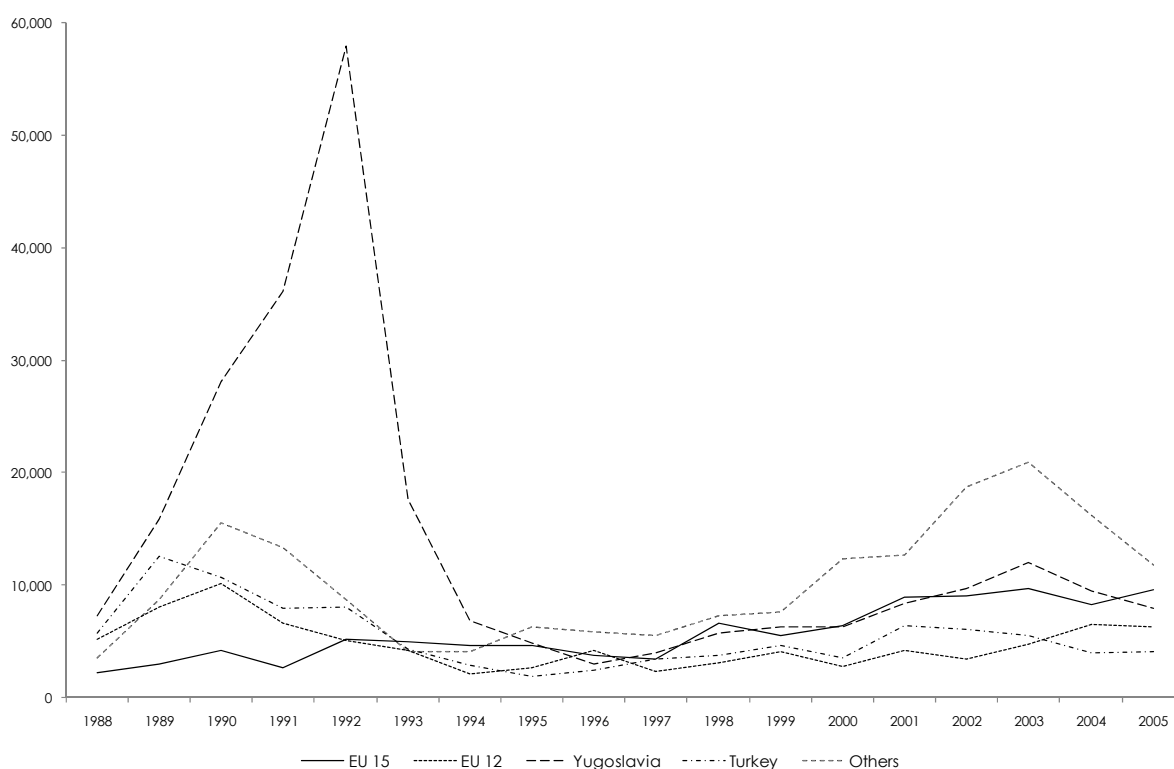
Source: Austrian Labour Force Survey (pooled values 2004-2007).

The third caveat with respect to our data applies to the fact that they are taken from a questionnaire which is subject to sampling error. This is of particular importance in the context of our application since the number of migrants from some countries is too small to allow for reliable estimates of the structure of migration of individual countries. Thus to minimize this problem aside from focusing on pooled data from 2004 to 2007, which reduces sampling error, for descriptive purposes we consider both data on an annual frequency from 1988 to

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[56] We define this set of developed countries as the countries which in the average of the years 1985 to 2005 had a human development index that exceeded 0.75 (see appendix 1 for a list of these countries).

2005, which may suffer from measurement error, as well as data on three year averages[57], which are likely to be less prone to such error. Furthermore, we gauge the potential impact of measurement error in our econometric analysis by also estimating models in which we exclude migrants from all sending countries for which we have less than 200 observations in our data, when considering the robustness of results.

Given these caveats Figure 5.3 displays the average number of migrants by year of settlement and region of interest for this chapter (EEA countries, other developed countries except former Yugoslavia and all other countries except former Yugoslavia) for the complete observation period (i.e. for the entry years 1988 to 2005). As can be seen migration from all countries oscillated substantially in the time period considered and as also amply documented in much of the literature on migration to Austria, was strongly procyclical with peaks of about 35,000 migrants still residing in Austria being reached from these regions in the years 1990 and 2003 or respectively the time periods 1988-1990 and 2003-2005. These peaks are both associated with beginning economic booms and increased demands for foreign labour at the end of the 1980's, where migration was also strongly driven by family reunion, and the beginning economic upswing in 2002-2003, while the trough between 1993 to 1997 is associated with slow economic development in combination with an increasingly restrictive migration policy.

Migration from the EEA countries to Austria, by contrast, was much more stable with a slight upward trend in the time period considered and started at around 5,300 persons who migrated to Austria in 1988 and still lived in Austria in 2004 to 2007, reached a trough in 1997 (with around 3,000 persons) and amounted to 7,500 persons by 2005.

Thus the rather different development of permanent migration from all over the world and the EEA countries suggests that comparing the EEA to the rest of the world may not provide the best comparison group on account of the high volatility of migration from the rest of the world. Permanent migration flows from other developed countries were much more in line with that of migration from the EEA in the time period considered. Here the opening of Central and Eastern Europe caused a substantial increase of migrants still living in Austria (from around 5,000 persons to over 10,000) from these countries in the time period from 1988 to 1990, but from the early 1990's onward migration trends between these two regions seem to accord with each other, so that the set of other developed countries may provide a better comparison group also from this point of view.

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[57] I.e. we consider averages for the years 1991-1993, 1994-1996, 1997-1999, 2000-2002 and 2003-2005 respectively

Figure 5.3: Foreign born residents in Austria (excluding former Yugoslavia) by year of settlement and country of birth (1988-2005)

Annual data

Aggregated Data
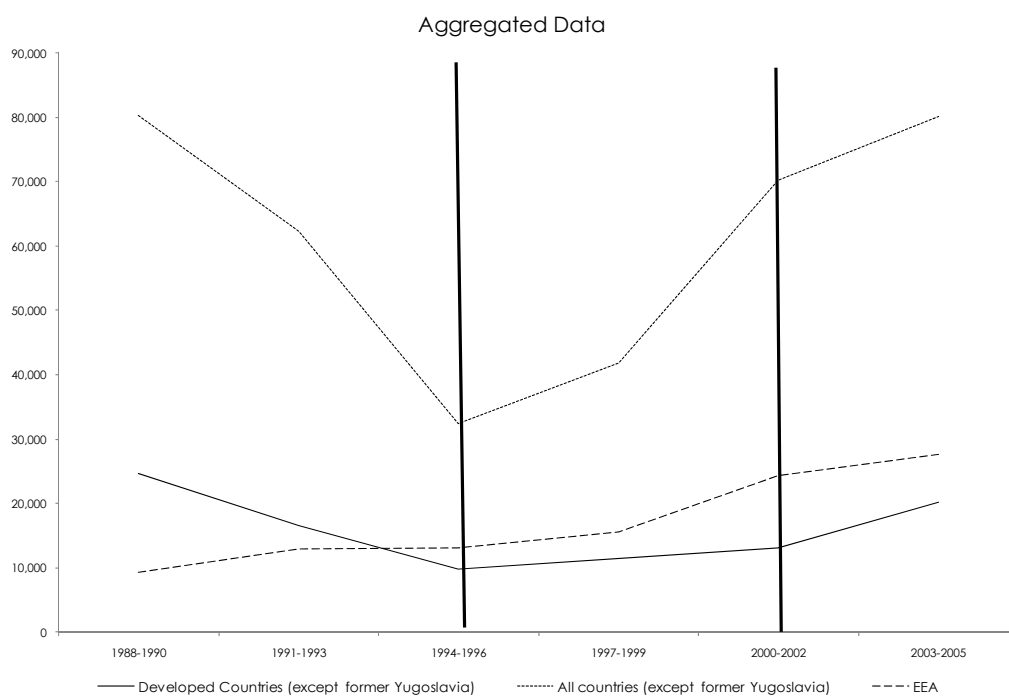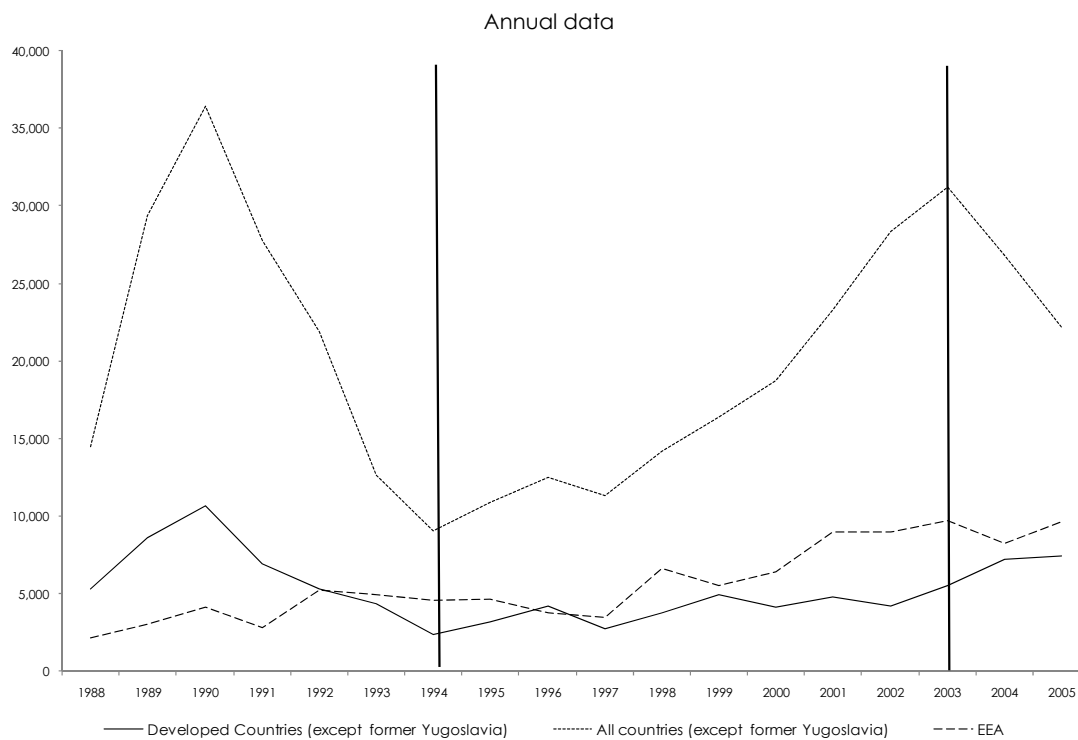
Source: Austrian Labour Force Survey (pooled values 2004-2007).

The skill structure of migration before and after accession to the EEA

From a point of view of migration figures and dynamics thus the other developed countries seem to be a much better comparison group to the EEA than migrants from the rest of the world. As can be seen from figure 5.4, in which we compare the skill structure of permanent migration from the EEA to Austria to that of other developed countries as well as the rest of the world in the years from 1988 to 2002, this also applies with respect to the education structure of migration before and after accession to the EEA.

Figure 5.4:   Share of high and low skilled migrants by country of birth in Austria (1991-2002)
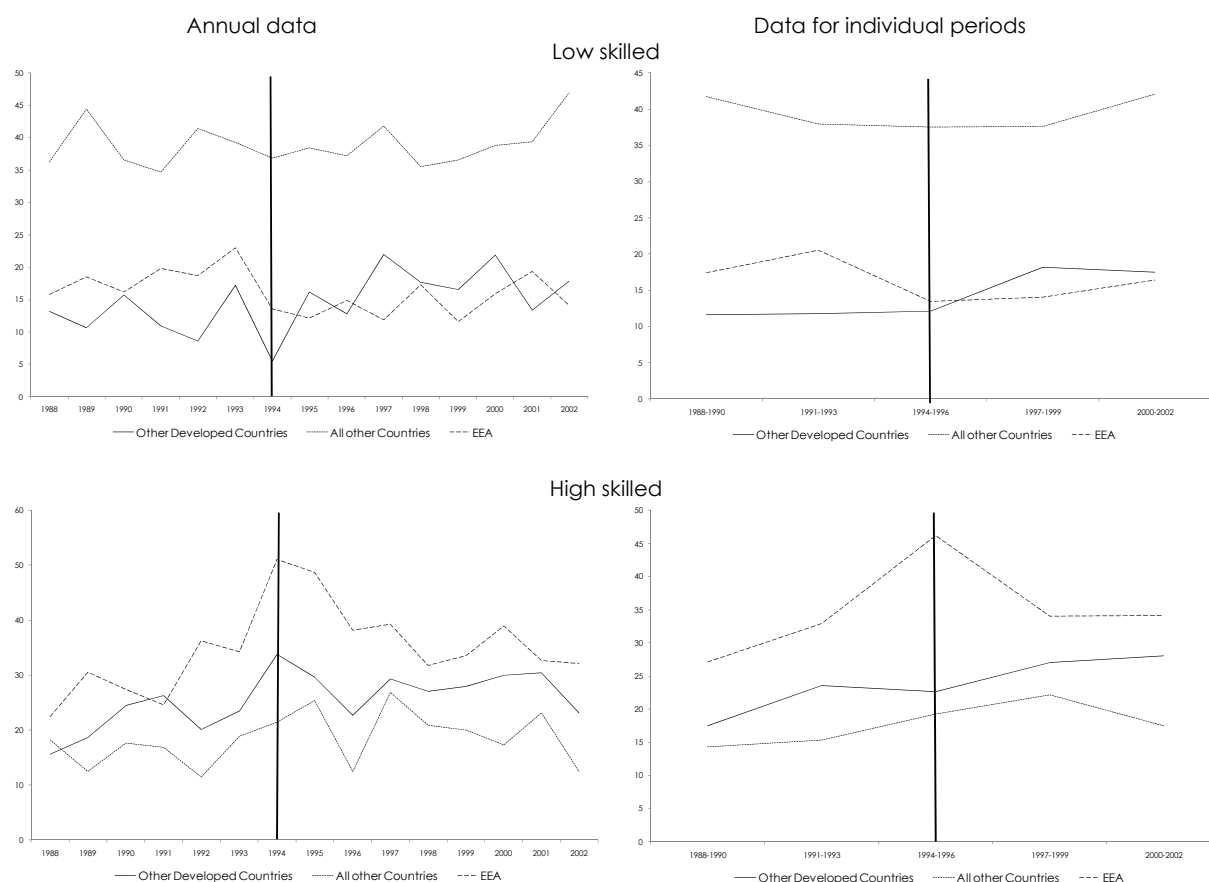
Source: Austrian Labour Force Survey (pooled values 2004-2007), excluding migrants from former Yugoslavia, developed countries = countries with an average HDI in excess of 0.75 for the years 1985-2005 (see Appendix for details).

The top panel of figure 5.4 shows the development of the share of permanent migrants with a low (ISCED 2 or lower) educational attainment level from the EEA and the other developed countries as well as all other countries in our sample both for annual as well as for data aggregated over three year periods. The bottom panel of this figure displays the development of the share of highly (i.e. ISCED 5 or more) skilled permanent migrants from these three regions. Considering the time period from 1988 to 1993 as the pre accession

period to the EEA and the time period 1994 to 2002 as the post accession period, this figure provides some descriptive evidence of the effects of accession to the EEA on the education structure of permanent migrants. In particular in the time period before 1994 in each year the share of low educated migrants from the EEA to Austria was higher than the share of low educated migrants from other developed countries, while in the period after 1994 (i.e. after accession to the EEA) this share was lower among the migrants from EEA countries than among migrants from other developed countries in every year except for the years 1995 and 2001. This thus suggests that the accession to the EEA and the associated liberalization of residence and labour market access from the EEA countries reduced the share of low skilled EEA-migrants to Austria. The share of low skilled permanent migrants from the rest of the world, by contrast, was substantially higher than among both the permanent migrants from the EEA as well as among permanent migrants from other industrialized countries both before and after accession to the EEA. Here visual inspection alone provides no clear cut evidence on whether this gap changed significantly after the accession to the EEA.

The evidence with respect to the share of highly skilled permanent migrants provided in this figure is, however, less conclusive also when only focusing on the comparison between permanent migrants from the EEA and other developed countries. In particular, as can be seen from the bottom panel of Figure 5.4, the share of highly educated migrants from the EEA was higher than that of highly educated migrants from other developed countries in all years (with the exception of the year 1991) and substantially higher than among migrants from all other countries throughout the whole period considered. Although this gap increased substantially in the years immediately following accession to the EEA, this effect seems to have been rather short lived, since from 1995 onwards the share of highly skilled migrants from the EEA once more started to converge to the levels of other developed countries (although remaining large in comparison to the rest of the world). Thus if there was any impact of accession to the EEA on the share of highly skilled migrants from the EEA at all, visual inspection suggests that this effect was rather short lived.

The skill structure of migration before and after 2003

Figure 5.5 repeats figure 5.4 for the time period 1997 to 2005 and thus focuses on the reform of residence law in 2003. In this figure data aggregated for sub-periods suggests that the gap in the share of permanent migrants with low educational attainment levels among other developed countries and the EEA countries narrowed slightly after 2003, while the gap in the share of highly skilled permanent migrants actually widened, and thus moved in the opposite direction of what would have been expected of a reform that focuses on attracting highly skilled permanent migrants. Relative to permanent migrants from all other countries, by contrast, both the share of less and highly educated permanent migrants from the EEA moved in parallel. This thus suggests that - at least from point of view of descriptive evidence – there seems to have been very little impact of the reforms of residence law in 2003 on the skill structure of permanent migration to Austria.

Figure 5.5:   Share of high and low skilled migrants by country of birth in Austria (1997-2005)
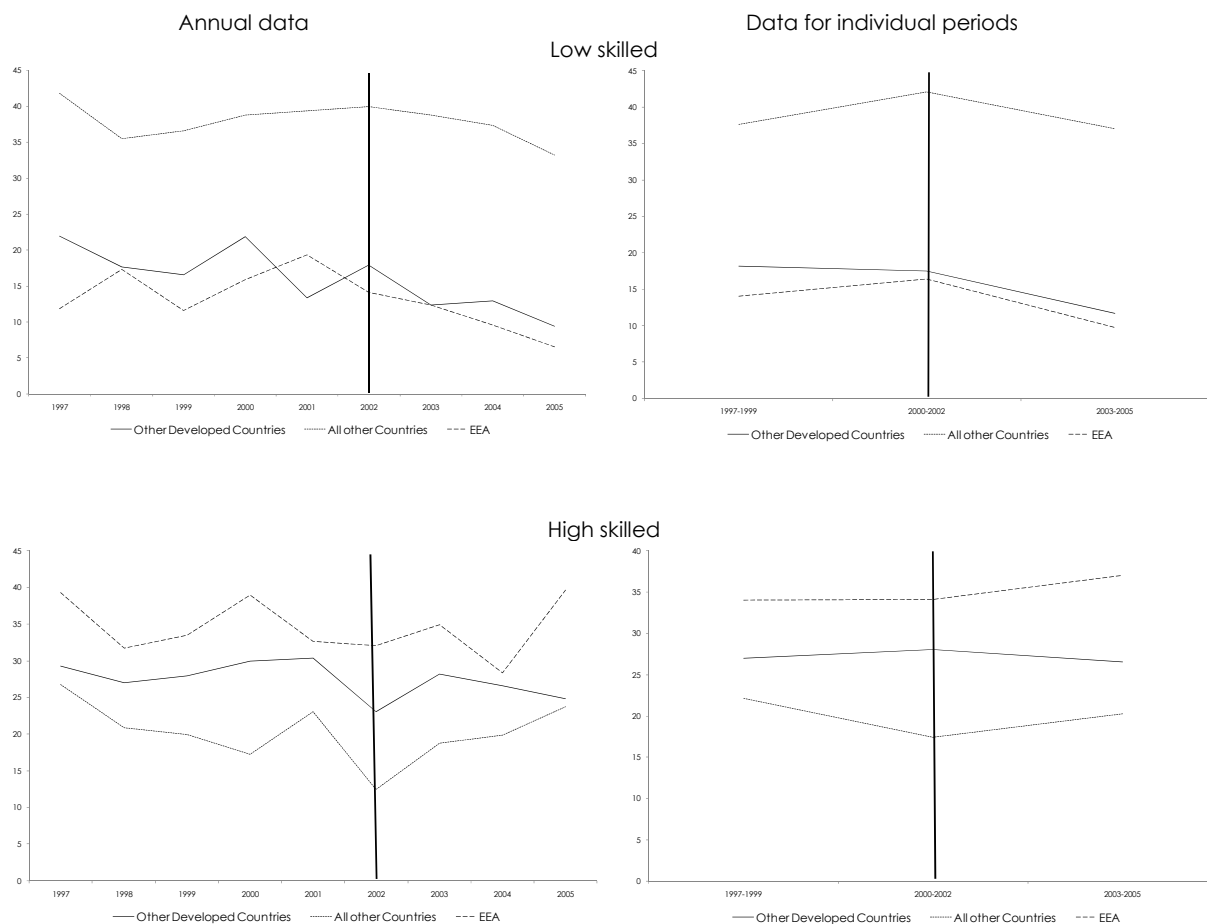
Annual data   Data for individual periods

Low skilled

High skilled

Source: Austrian Labour Force Survey (pooled values 2004-2007). – Excluding migrants from former Yugoslavia, developed countries = countries with an average HDI in excess of 0.75 for the years 1985-2005 (see Appendix for details).

This conclusion is reconfirmed when considering annual data. As can be seen on the left hand side of figure 5.5 the share of the highly skilled permanent migrants from the EEA and other developed as well as all other countries oscillated substantially both over the period before and after 2003. The finding of reduced disparities among low skilled permanent migrants from the EEA and other developed countries in the period 2003 to 2005 primarily hinges on the year 2005, in which the Austrian Labour Force Survey registered an unusually high share of highly skilled permanent migrants from the EEA.[58]

For the low skilled the evidence of a shift after 2003 based on annual data is also inconclusive. Here – as can be seen from the top panel of figure 5.5 – the share of low skilled foreign born from the EEA was lower than from other developed countries.

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[58] These migrants often came from Germany and arrived in Austria as a consequence of the Hart IV reforms.

5.4   Method

Descriptive evidence thus suggests that relative to permanent migration from other developed countries the share of low skilled permanent migrants from EEA reduced after Austria's accession to the EEA, while evidence with respect to other indicators of migrant quality to Austria is more mixed, both for the period after the accession to the EEA as well as after the reform of residence law in 2003, with only very few general results emerging from the descriptive evidence.

More robust empirical evidence on the impact of these two reforms in residence law on the skill structure of permanent migration can be obtained by using a difference-in-difference approach[59]. Here we can exploit the fact that both Austria's accession to the EEA as well as the reform of residence law in 2003 affected only certain groups of migrants. In the case of the accession to the EEA only migrants from EEA countries were affected by the policy change, while migrants from outside the EEA remained unaffected. In the case of the reforms of residence law in 2003, by contrast, only migrants from outside the EEA were affected, while migrants from EEA-countries remained unaffected.

Thus a more formal statistical analysis of the differences in the development of the education structure of the various groups of migrants from EEA countries and other third countries can be used to identify the potential impact of reforms in migration policy on the structure of migration in Austria. Dividing the data set of countries (indexed by i) into a subset of countries (denoted by R) that were affected by the reform and another subset that was not affected, and grouping the time period (indexed by t) considered into a pre-reform and a post reform period (with τ the period in which reforms occurred) the impact of a change in migration policy can be identified by the parameter δ in a regression of the form as:

$$(5.1) \qquad y_{jit} = \alpha_t D_t + \beta_i D_i + \lambda X_j + \gamma Y_{it} + \delta D_{t \geq \tau} D_{i \in R} + \xi_{it}$$

Where y_{jit} is a set of outcome indicators (such as being a highly skilled migrant) for an individual migrant (j) that migrated to Austria from country i in time period t, D_t is a set of dummy variables for each individual time period of migration, which measures changes in the skill structure of migrants over time that are common to all sending countries, D_i is a dummy variable for each sending country considered, which measures country specific (but time invariant) influences on the skill structure, X_j is a set of individual characteristics that may impact on the skill structure of migrants and Y_{it} is a set of time varying sending country characteristics that influence the skill structure of migration. α_t, β_i, λ and γ finally are a set of parameter vectors to be estimated.

The central parameter of interest in this regression is δ. This measures the average change in y_{jit} on the treated relative to the untreated migrant groups. This is because $D_{t \geq \tau}$ is a dummy

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[59] As pointed out by *Angrist - Kruger* (1999) this approach is particularly "…well suited to estimating the effect of sharp changes in economic environment or government policy (see *Angrist - Krueger*, 1999, p. 1,296). This provides support for using this approach in our context, since both reforms of migration policy analysed in this chapter do indeed represent such a sharp change in economic policy.

variable that takes on the value of 1 if the time period under consideration is a post reform period (i.e. $t \geq \tau$) and $D_{i \in R}$ is a dummy variable which takes on the value one if the country under consideration belongs to the group of the treated countries (i.e. $i \in R$). A statistically significant positive value of this parameter would thus suggest that (relative to the untreated) the outcome indicator increased after the reform, while a statistically significant negative parameter would imply that the outcome indicator reduced for the treated (relative to the untreated) after reforms.

5.5   Results

The accession to the European Economic Area (EEA)

Tables 5.4 and 5.5 present logit estimation results as marginal effects (equation 5.1)[60].These tables consider two alternative models, which differ with respect to the comparison group for EEA accession. In the first model (table 5.4) we compare migrants from EEA countries and other developed countries (excluding Yugoslavia) in the time period 1988 to 2002. As already stated above, we consider this comparison as our benchmark case, because of the higher comparability of the developed countries to the EEA. In the second model (table 5.5) we compare migrants from EEA countries to all other countries (including the less developed countries) in the years 1988 to 2002. This comparison has the advantage of a larger number of observations than in the first case, but has the disadvantage that migration from less developed countries may be influenced by a number of political factors (e.g. through refugee migration) for which we cannot properly control in our approach.

Furthermore in each of these tables coefficients for both the specification presented in equation (5.1) as well for a specification in which we allow treatment effects to vary over post-treatment time periods are reported. Table 5.6 augments these results by also presenting results with time varying treatment effects on an annual basis.[61] In each of these specifications the dependent variables are either the probability of a migrant having a high, medium or low educational attainment level, respectively.

Aside from controlling for a full set of time and sending country dummies (which are not reported in the tables), in all the regressions we also include (the log of) age and age squared as well as dummy variables for females, married persons and persons with children as controls for individual characteristics (i.e. our X_j variables). We do this because previous research on Austria by *Bock-Schappelwein et al.* (2008) as well as other countries (see *Chiswick - Miller,* 2005) shows that the highest educational attainment level of migrants is nonlinearly related to age and that migrant women in general have a lower educational

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[60] The use of logit estimation is necessary in our case because being high or low skilled represents a binary outcome.

[61] In these regressions we depart from equation 5.1 only in so far as we allow δ to vary over different post treatment periods. We do this because *Angrist - Krueger* (1999) suggest that allowing for time varying treatment effects increases the credibility of identification of treatment effects and because this allows for a further robustness check of our results.

attainment level than migrant men and because there is also some evidence (see *Borjas* 1997) that migrants, who enter a country under family reunion schemes (which may be considered particularly likely among the married and those with children) have a lower educational attainment level than others. Thus these variables control for any potential shifts in the structure of migration with respect to gender, age, and family status before and after the accession to the EEA.

The marginal effects of these control variables reported in tables 5.4 and table 5.5 are in line with expectations and previous results. In both tables the probability of a migrant having a low educational attainment level decreases with age but increases with age squared, while the impact of the age variables is significant but oppositely signed for the probability of a migrant having a medium or higher educational attainment level.[62] Furthermore, female migrants have a significantly (by 4 to 5 percentage points) lower probability to be highly skilled and in the case of migrants from all other countries also a significantly (by between 8 to 9 percentage points) higher probability of having a low educational attainment level. Migrants with children in average have a by 5 to 7 percentage point higher probability to have a low educational attainment level and a by around 7 to 8 percentage point lower probability to have a medium educational attainment level. The only variable that remains insignificant throughout is the dummy variable for married migrants.[63]

In addition since the time period of our comparison is rather long we also control for a number of time varying sending country characteristics (our Y_{it} variables). These are the (logs of) annual US-Dollar GDP per capita taken from United Nations Statistical Database as well as the infant mortality rate taken from UNICEF (CME[64] Info), the share of low skilled in the total population in five year intervals (taken from *Barro – Lee* (2000) and *Cohen-Soto* (2001)and augmented by national statistics wherever possible), as well as the five year average of the Gini-coefficient of the individual income distribution (taken from the UNU-WIDER[65] - World Income Inequality Database (WIID)). We include these variables because a substantial literature suggests that the structure of emigration from a country depends on the level of economic development of a country (which we proxy by GDP per capita and infant mortality) and the educational structure of the native population, which is proxied by the share of low skilled among the resident population. The Gini-coefficient, finally, is included to control for effects on the structure of migration that result from the income distribution in the sending country as suggested in a large part of the literature on migrant selectivity.

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[62] This is consistent with the results of *Chiswick - Miller* (2008), who find that the lowest educational attainment of migrants is found among those that moved after compulsory educations, and that thus the relationship between age and educational attainment of migrants is non-linear.

[63] This thus suggests that either the impact of family reunion on the skill structure is less relevant than originally hypothesized or that marital status is only a very imperfect proxy for family reunion.

[64] Child Mortality Estimation, for more details see www.childmortality.org.

[65] United Nations University – World Institute for Development Economics Research; http://www.wider.unu.edu/research/Database/en_GB/database/

Table 5.4: Logit regression results of the probability for a migrant being high, medium or low skilled before and after accession to the EEA (relative to migrants from other developed countries)

	Low educated		Medium education		High education	
	(1)	(2)	(1)	(2)	(1)	(2)
1994-03 X EEA	–0.082 ***		0.043		0.039	
	(0.027)		(0.027)		(0.050)	
1994-96 X EEA		–0.080 ***		–0.033		0.122
		(0.023)		(0.077)		(0.091)
1997-99 X EEA		–0.068 **		0.114 *		–0.060
		(0.034)		(0.069)		(0.046)
2000-02 X EEA		–0.082 ***		0.069		0.028
		(0.028)		(0.074)		(0.064)
Ln(age)	–3.867 ***	–3.763 ***	3.485 ***	3.226 ***	4.736 ***	4.846 ***
	(0.261)	(0.277)	(0.535)	(0.461)	(0.430)	0.469
Ln(age)^2	0.521 ***	0.507 ***	–0.487 ***	–0.450 ***	–0.613 ***	–0.630 ***
	(0.037)	(0.039)	(0.075)	(0.066)	(0.059)	(0.064)
Female	0.014	0.018	0.029	0.033	–0.043 **	–0.049 **
	(0.016)	(0.016)	(0.025)	(0.022)	(0.020)	(0.021)
Married	–0.007	–0.019	0.014	0.033	–0.009	–0.016
	(0.021)	(0.021)	(0.028)	(0.029)	(0.018)	(0.020)
Children	0.045 **	0.050 ***	–0.066 **	–0.077 **	0.020	0.025
	(0.019)	(0.021)	(0.026)	(0.026)	(0.022)	(0.023)
ln(gdp)	0.046	0.037	–0.012	0.011	–0.042	–0.050
	(0.039)	(0.038)	(0.058)	(0.069)	(0.054)	(0.070)
ln(share low educated)	–0.012	0.032	0.189 *	0.160	–0.193 **	–0.204 *
	(0.062)	(0.069)	(0.103)	(0.142)	(0.087)	(0.114)
ln(gini)	–0.291 **	–0.216 *	0.252	0.193	0.098	0.103
	(0.104)	(0.119)	(0.215)	(0.233)	(0.185)	(0.208)
ln(infant mortality)	0.002	–0.121	0.125	0.236	–0.172	–0.170
	(0.107)	(0.119)	(0.174)	(0.191)	(0.131)	(0.148)
Peudo R2	0.211	0.215	0.085	0.091	0.156	0.1603
Log Likelyhood	–6,3721,371	–54,300,712	–11,093,421	–95,195,725	–88,027,425	–76,466,291

Source: Austrian Labour Force Suvey (pooled values 2004-2007), WIFO-calculations. – Reference group are migrants from industrialized countries (excluding former Yugoslavia), table reports marginal effects of equation 4.1, values in brackets are (cluster corrected) standard errors of the estimate, ***, (**) and (*) signify significance at the 1%, (5%) and (10%) level, respectively. Country and time fixed effects not reported.

Table 5.5: Logit regression results of the probability for a migrant being high, medium or low skilled before and after accession to the EEA (relative to all other migrants)

	Low education		Medium education		High education	
	(1)	(2)	(1)	(2)	(1)	(2)
1994-03XEEA	−0.090 ***		0.059		0.023	
	(0.029)		(0.044)		(0.031)	
1994-96 X EEA		−0.115 ***		−0.012		0.081
		(0.033)		(0.058)		(0.060)
1997-99 X EEA		−0.084 **		0.149 ***		0.034
		(0.033)		(0.049)		(0.026)
2000-02 X EEEA		−0.096 ***		0.091 *		0.012
		(0.036)		(0.053)		(0.036)
Ln(age)	−5.731 ***	−5.786 ***	3.946 ***	3.742 ***	3.661 ***	3.588 ***
	(0.351)	(0.379)	(0.477)	(0.444)	(0.322)	(0.343)
Ln(age)^2	0.780 ***	0.788 ***	−0.558 ***	−0.529 ***	−0.475 ***	−0.467 ***
	(0.049)	(0.053)	(0.068)	(0.064)	(0.044)	(0.047)
Female	0.078 ***	0.088 ***	−0.017	−0.020	−0.040 ***	−0.043 ***
	(0.019)	(0.020)	(0.023)	(0.023)	(0.014)	(0.014)
Married	0.006	0.001	−0.001	0.012	−0.001	−0.007
	(0.026)	(0.028)	(0.025)	(0.026)	(0.013)	(0.014)
Children	0.063 ***	0.067 ***	−0.056 ***	−0.065 ***	−0.003	0.002
	(0.020)	(0.021)	(0.021)	(0.021)	(0.014)	(0.015)
ln(gdp)	0.048	0.067	0.001	0.008	−0.030	−0.034
	(0.041)	(0.044)	(0.047)	(0.052)	(0.034)	(0.040)
Ln(share low educated)	−0.035	−0.009	0.169 *	0.150	−0.137 **	−0.140 *
	(0.088)	(0.100)	(0.099)	(0.132)	(0.063)	(0.081)
ln(gini)	−0.365 ***	−0.370 ***	0.384 **	0.385 *	0.054	0.048
	(0.140)	(0.152)	(0.182)	(0.201)	(0.114)	(0.124)
ln(infant mortality)	0.031	−0.057	0.057	0.099	−0.131 *	−0.122
	(0.106)	(0.124)	(0.126)	(0.138)	(0.079)	(0.084)
Peudo R2	0.299	0.296	0.111	0.114	0.197	0.207
Log Likelyhood	−10,701,735	−95,572,064	−155,500,000	−137,400,000	−109,900,000	−96,476,231

Source: Austrian Labour Force Suvey (pooled values 2004-2007), WIFO-calculations. – Reference group are all migrants from other countries (excluding former Yugoslavia), table reports marginal effects of equation 4.1, values in brackets below marginal effects are (cluster corrected) standard errors of the estimate, ***, (**) and (*) signify significance at the 1%, (5%) and (10%) level, respectively. Country and time fixed effects not reported.

Table 5.6: Logit regression results of the probability for a migrant being high, medium or low skilled before and after accession to the EEA (annual effects)

	Low skilled		Medium Skiled		High Skilled	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
1994*EEA	−0.035	−0.079 *	−0.080	−0.106 *	0.115	0.137
	(0.075)	(0.042)	(0.103)	(0.064)	(0.126)	(0.099)
1995*EEA	−0.089 ***	−0.117 ***	0.080	0.020	0.022	0.030
	(0.023)	(0.042)	(0.074)	(0.080)	(0.083)	(0.055)
1996*EEA	−0.076 ***	−0.095 **	−0.156	−0.032	0.352	0.172
	(0.025)	(0.045)	(0.096)	(0.089)	(0.167)	(0.131)
1997*EEA	−0.077 **	−0.126 ***	0.138	0.198	−0.047	−0.057 *
	(0.034)	(0.031)	(0.099)	(0.080)	(0.056)	(0.030)
1998*EEA	−0.074 **	−0.013 **	0.117	0.088	−0.096 **	−0.050
	(0.039)	(0.050)	(0.103)	(0.068)	(0.044)	(0.031)
1999*EEA	−0.059 *	−0.103 ***	0.101	0.127 **	−0.001	−0.001
	(0.032)	(0.033)	(0.074)	(0.063)	(0.063)	(0.042)
2000*EEA	−0.082 ***	−0.090 **	0.019	−0.010	0.087	0.073
	(0.020)	(0.036)	(0.095)	(0.078)	(0.089)	(0.061)
2001*EEA	−0.049	−0.005	0.127	0.088	−0.072	−0.053 **
	(0.044)	(0.085)	(0.079)	(0.062)	(0.048)	(0.026)
2002*EEA	−0.097 ***	−0.137 ***	0.084	0.127	0.124	0.098
	(0.022)	(0.034)	(0.080)	(0.065)	(0.115)	(0.072)
Peudo R2	0.214	0.296	0.088	0.112	0.163	0.202
Log Likelyhood	−63,503,603	−106,800,000	−110,600,000	−155,100,000	−87,270,017	−109,200,000

Source: Austrian Labour Force Suvey (pooled values 2004-2007), WIFO-calculations. – Model 1= reference group are migrants from developed countries (excluding former Yugoslavia), Model 2 = reference group are all countries (excluding former Yugoslavia), table reports marginal effects of equation 4.1, values in brackets are (cluster corrected) standard errors of the estimate, ***, (**) and (*) signify significance at the 1%, (5%) and (10%) level, respectively. Country and time fixed effects as well as effects of age, age squared, married, children and macro-economic variables not reported.

When considering the marginal effects of these variables, however, many of them remain insignificant, which may be indication that these variables provide to little variance to identify their effect on the skill structure of migration after controlling for time and sending country fixed effects. The only exceptions are the Gini–coefficient and the share of low skilled migrants residing in a country. The Gini-coefficient has a significant negative impact on the probability of a migrant being low skilled when considering the developed countries as well as a significant negative impact on the probability of low skilled and a significant positive impact on the probability of having an medium educational attainment level when considering all countries. This thus indicates that low skilled migrants disproportionately often

come to Austria from countries with low income disparities. The share of low skilled migrants residing in a country – as could expected – has a negative impact on the probability of a migrant being highly skilled.

The central variables of interest in tables 5.4 to 5.6 are, however, the time variables – EEA interaction variables reported in the top rows of these tables. With respect to these variables results for the low skilled imply that the probability of a permanent migrant from the EEA countries having a low educational attainment level relative to that of a permanent migrant from other countries decreased significantly after Austrian accession to the EEA. The δ coefficients are statistically significantly negative for all post accession periods both when allowing for time invariant effects as well as when allowing for different treatment effects by time periods.

The size of the marginal effects suggest that after accession to the EEA the probability of a permanent migrant from the EEA being low skilled reduced by 8.2 percentage points relative to permanent migrants from other developed countries and by 9.0 percentage points relative to permanent migrants from all other countries. These effects are robust across time periods with marginal effects in the period 1994-1996 slightly higher and in the time period 1997-1999 slightly lower than average. In addition when allowing effects to vary by years, marginal effects are significantly negative for each year except for the accession year (1994) and the year 2001. In sum this implies highly robust evidence that after Austria's accession to the EEA the share of low skilled permanent migrants from the EEA reduced relative to the share of low skilled migrants from other countries coming to Austria. This in turn suggests a negative impact of the EEA-accession on the share of low skilled migrants coming to Austria from this region.

Results with respect to the probability of a permanent migrant having a medium or high educational attainment level, by contrast, are somewhat more volatile. Here estimates for all versions of the comparison shown in tables 5.4 and 5.5, although suggesting a positive impact of the EEA-accession on the skill structure of migrants (that in sum is equal to the negative effect on the low skilled), remain insignificant both when comparing the skill structure of permanent migrants from the EEA to that of all countries (including those from less developed countries), as well as when considering other developed countries as a comparison group. The only exception to this is a significant increase in the share of migrants with a medium educational attainment level in the years 1997 to 1999 and for some individual years when comparing the EEA permanent migrants to migrants from the rest of the world. This, however, could also be an indication of potential missing variable bias with respect to this comparison and suggests that both the share of medium and highly skilled permanent migrants from the EEA increased as a result of Austria's accession to the EEA, but that both these effects are small to become statistically significant.

Thus, summarizing our results so far, we find that after Austria's accession to the EEA and the associated complete liberalization of residence and labour market access, the share of low skilled migrants from the EEA decreased relative to the share of low skilled permanent

migrants from other countries, but that these shifts in structure occurred both in the direction of the medium as well as the high skilled so that statistical methods cannot identify reliably, which of these two groups were affected most strongly.

The reform of Austrian residence law in 2003

Tables 5.7 and 5.8 report the results when estimating a similar logit model as above for permanent migrants that moved to Austria in the time period 1997 to 2005 and thus test for significant changes in migrant educational attainment structure after the reform of residence law in 2003. Once more in each of these tables coefficients for both the specification presented in equation (5.1) as well for a specification in which we allow for time varying treatment effects by year[66] are reported. Table 5.7 considers the results of comparing migrants from the EEA to other developed countries (excluding Yugoslavia), while table 5.8 considers results when comparing these migrants to migrants from all other countries.

Again the marginal effects of the control variables accord closely both in sign and magnitude with those already found for the time period 1988 to 2002. As for the previous period the probability of a permanent migrant being low skilled increases with age and decreases with age squared, and the impact of the age variables is significant but oppositely signed for the probability of a permanent migrant having a medium or higher educational attainment level, female migrants have a significantly (by 4 to 5 percentage points) lower probability to be highly skilled and in the case of permanent migrants from all other countries also a significantly (by around 9 percentage points) higher probability of having a low educational attainment level, migrants with children have a by around 8 to 11 percentage point higher probability to have a low educational attainment level and a by around 7 to 8 percentage point lower probability to have a medium educational attainment level; the dummy variable for married migrants remains insignificant. Also, in accordance to previous findings, the marginal effects of variables measuring time varying variables for sending countries tend to remain insignificant even for the Gini-coefficient and the share of low skilled in the sending country.[67] Here the only exception is GDP per capita, which is on the margin of significance when considering the probability of a permanent migrant having a low educational attainment level for the sample of developed countries.

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[66] Note that in this case due to the short post-treatment period, we cannot consider the effects for individual time periods.

[67] This loss of significance, however, is due to the fact that our data only provides very few observation periods when considering the period from 1997 to 2005 so that the effects of these variables cannot be identified once time and sending country fixed effects are controlled for.

Table 5.7: Logit regression results of the probability for a migrant being high, medium or low skilled before and after reform in residence law 2003 (relative to migrants from other developed countries)

	Low educated		Medium education		High education	
	(1)	(2)	(1)	(2)	(1)	(2)
2003-05 X EEA	0.014		0.107		–0.097	
	(0.037)		(0.068)		(0.067)	
2003 X EEA		0.035		0.076		–0.086
		0.031		0.069		0.083
2004 X EEA		0.003		0.007		0.007
		0.045		0.071		0.062
2005 X EEA		–0.019		0.255 ***		–0.238 ***
		0.079		0.065		0.082
Ln(age)	–3.755 ***	–3.752 ***	1.897 **	1.859 **	6.104 ***	6.195 ***
	(0.312)	(0.316)	(0.909)	(0.916)	(0.812)	(0.825)
Ln(age)^2	0.515 ***	0.515 ***	–0.277 **	–0.272 **	–0.812 ***	–0.823 ***
	(0.044)	(0.045)	(0.128)	(0.129)	(0.112)	(0.113)
Female	0.023	0.023	0.045	0.043	–0.052 *	–0.050 *
	(0.017)	(0.018)	(0.028)	(0.028)	(0.027)	(0.027)
Married	–0.008	–0.008	0.007	0.012	–0.002	–0.004
	(0.025)	(0.025)	(0.031)	(0.031)	(0.026)	(0.026)
Children	0.077 **	0.076 **	–0.073 *	–0.072 *	–0.014	–0.016
	(0.031)	(0.031)	(0.038)	(0.038)	(0.038)	(0.039)
ln(gdp)	0.155 *	0.187 *	–0.031	–0.180	–0.128	–0.046
	(0.088)	(0.097)	(0.135)	(0.143)	(0.129)	(0.137)
ln(share low educated)	–0.076	–0.086	–0.057	–0.009	0.109	0.088
	(0.061)	(0.061)	(0.115)	(0.108)	(0.102)	(0.103)
ln(gini)	0.237	0.230	–0.531	–0.473	–0.111	–0.178
	(0.237)	(0.230)	(0.532)	(0.494)	(0.457)	(0.447)
ln(infant mortality)	–0.348	–0.350	0.157	0.121	0.163	0.196
	(0.243)	(0.242)	(0.380)	(0.373)	(0.331)	(0.325)
Peudo R2	0.178	0.179	0.082	0.089	0.152	0.155
Log Likelyhood	–45,004,914	–44,983,881	–78,602,751	–78,373,687	–64,381,095	–64,183,737

Source: Austrian Labour Force Suvey (pooled values 2004-2007), WIFO-calculations. – Reference group are migrants from developed countries (excluding former Yugoslavia), table reports marginal effects of equation 4.1, values in brackets are (cluster corrected) standard errors of the estimate, ***, (**) and (*) signify significance at the 1%, (5%) and (10%) level, respectively. Nobs = number of observations. Country and time fixed effects not reported.

Table 5.8: Logit regression results of the probability for a migrant being high, medium or low skilled before and after reform in residence law 2003 (relative to migrants from all other countries)

	Low educated		Medium education		High education	
	(1)	(2)	(1)	(2)	(1)	(2)
2003-05 X EEA	0.093 **		0.026		−0.064	
	(0.047)		(0.054)		(0.047)	
2003 X EEA		0.090 **		0.000		−0.043
		(0.042)		(0.055)		(0.055)
2004 X EEA		0.095		−0.082		−0.002
		(0.050)		(0.060)		(0.039)
2005 X EEA		0.085		0.141 ***		−0.153 **
		(0.089)		(0.052)		(0.072)
Ln(age)	−5.935 ***	−5.934 ***	3.016 ***	3.015 ***	4.090 ***	4.133 ***
	(0.458)	(0.460)	(0.764)	(0.757)	(0.502)	(0.500)
Ln(age)^2	0.824 ***	0.824 ***	−0.438 ***	−0.438 ***	−0.543 ***	−0.548 ***
	(0.065)	(0.065)	(0.110)	(0.109)	(0.070)	(0.070)
Female	0.088 ***	0.088 ***	−0.006	−0.007	−0.041 ***	−0.040
	(0.023)	(0.023)	(0.029)	(0.029)	(0.016)	(0.016)
Married	−0.016	−0.016	0.009	0.012	0.004	0.003
	(0.032)	(0.033)	(0.028)	(0.028)	(0.017)	(0.017)
Children	0.106 ***	0.106 ***	−0.078 ***	−0.079 ***	−0.015	−0.015
	(0.029)	(0.029)	(0.027)	(0.027)	(0.023)	(0.023)
ln(gdp)	0.107	0.109	0.076	0.022	−0.073	−0.043
	(0.090)	(0.094)	(0.095)	(0.088)	(0.070)	(0.069)
ln(share low educated)	−0.075	−0.076	−0.055	−0.033	0.065	0.053
	(0.080)	(0.079)	(0.097)	(0.092)	(0.071)	(0.068)
ln(gini)	−0.096	−0.097	−0.267	−0.206	0.141	0.104
	(0.342)	(0.343)	(0.431)	(0.420)	(0.259)	(0.257)
ln(infant mortality)	0.000	0.000	−0.077	−0.060	0.102	0.089
	(0.191)	(0.195)	(0.187)	(0.159)	(0.180)	(0.161)
Peudo R2	0.307	0.307	0.121	0.123	0.207	0.208
Log Likelyhood	−80,493,109	−80,492,535	−113,900,000	−113,600,000	−81,470,559	−81,313,363

Source: Austrian Labour Force Suvey (pooled values 2004-2007), WIFO-calculations. – Reference group are migrants from all countries (excluding former Yugoslavia), table reports marginal effects of equation 4.1, values in brackets are (cluster corrected) standard errors of the estimate, ***, (**) and (*) signify significance at the 1%, (5%) and (10%) level, respectively. Nobs = number of observations. Country and time fixed effects not reported.

With respect to the variables of interest (i.e. the interaction terms for the time period and migrants from EEA member states) the majority of our results, however, indicate that there were no significant changes in permanent migrants' skill structure from third countries relative to those from the EEA after the reforms of residence law in 2003. It sometimes even suggests that the skill structure of migrants from third countries worsened after the reform. For instance

when considering the estimates of δ parameter in the logit estimates for the probability of a permanent migrant having a low educational attainment level and using migrants from all countries as a treatment group (see table 4.5), we find that after the reforms in 2003 the probability of a migrant from countries outside the EEA being low skilled (relative to that of a migrant from EEA countries being low skilled) increased significantly (by 9.3 percentage points). This result is, however, not robust and loses its statistical significance when considering the comparison to developed countries only.

Furthermore when considering the annual impact of reforms we find that marginal effects of the year-EEA interactions vary substantially over individual time periods with the only significant and robust result indicating a shift of the skill structure of migrants from third countries from the high to the medium skilled, which once more would indicate a worsening rather than an improvement of the educational attainment structure of permanent migrants after reforms.

In sum thus, we conclude that results with respect to the reform of residence law in 2003 are not very robust, but that the majority of significant results point to an unexpected negative impact of these reforms on the average educational attainment structure of migrants, with increased shares of low skilled migrants, and reduced shares of highly skilled permanent migrants from third countries in particular in the year 2005. This thus suggests that reforms of residence law in 2003 at least did not have a positive impact on the skill structure of permanent migrants from third countries. This, however, seems logical given that only between 1/3 and 1/6 of total annual imigration from third countries was covered by the new legislation.

5.6   Robustness

There are a number of criticisisms that could be leveled against our results so far. First, with respect to the time period considered – as discussed above – one could argue that in particular the late 1980's may have been a rather special period in Austrian migration history. This thus raises the question as to how sensitive our results are to a change in the time period of comparison. Second, as also discussed above, focusing on the Austrian Labour Force Survey induces an element of measurement error into our estimates that could impact on our results. Thus one could ask, what the potential effects of these measurement errors are. Third, as also shown above, most of our results indicate that controls for time varying sending country characteristics mostly remain insignificant. One may thus wonder, how these variables impact results. Similarly one could also wonder, what the impacts of controlling for individual characteristics are on results. Fourth, one may also object to using the total foreign born population, rather than active age groups that may be less strongly affected by still receiving education.

Table 5.9: Logit regression results of the probability for a migrant being high, medium or low skilled before and after accession to the EEA (alternative specifications)

	1994-96 X EEA		1997-99 X EEA		2000-02 X EEA		Pseudo R2	Log Likelyhood
	Shorten Period to 1991-2002							
Low education	–0.083	***	–0.078	**	–0.103	***	0.220	–46,524,492
	0.027		0.039		0.035			
Medium education	–0.026		0.126	*	0.098		0.087	–82,617,851
	0.080		0.074		0.084			
High education	0.146		–0.041		0.064		0.161	–67,469,212
	0.097		0.056		0.079			
	Exclude national variables							
Low education	–0.084	***	–0.079	**	–0.088	***	0.234	–50,313,377
	0.026		0.036		0.024			
Medium education	–0.032		0.113	*	0.081		0.093	–86,418,076
	0.073		0.067		0.056			
High education	0.143	*	–0.062		0.034		0.161	–70,501,932
	0.087		0.043		0.056			
	Focusing only on sending countries with more than 200 observations							
Low education	–0.132	***	–0.085	**	–0.114	***	0.308	–80,930,002
	(0.034)		(0.039)		(0.043)			
Medium education	–0.014		0.170	**	0.138	**	0.108	–116,400,000
	(0.060)		(0.050)		(0.056)			
High education	0.095		–0.044		–0.001		0.214	–78,626,673
	(0.064)		(0.027)		(0.037)			
	Excluding individual variables							
Low education	–0.081	***	–0.071	**	–0.092	***	0.054	–65,477,492
	(0.027)		(0.034)		(0.030)			
Medium education	–0.034		0.099		0.062		0.074	–96,930,198
	(0.077)		(0.067)		(0.074)			
High education	0.122		–0.028		0.059		0.097	–82,232,946
	(0.088)		(0.050)		(0.064)			
	Only 20 – 65 year olds							
Low education	–0.064	**	–0.055	**	–0.079	**	0.093	–46,529,115
	(0.023)		(0.027)		(0.024)			
Medium education	–0.056		0.131	**	0.088		0.091	–84,394,947
	(0.083)		(0.068)		(0.074)			
High education	0.133		–0.067		0.030		0.142	–71,645,741
	(0.099)		(0.054)		(0.073)			

Source: Austrian Labour Force Suvey (pooled values 2004-2007), WIFO-calculations. – Reference group are migrants from countries excluding former Yugoslavia, table reports marginal effects of equation 4.1, values in brackets are (cluster corrected) standard errors of the estimate, ***, (**) and (*) signify significance at the 1%, (5%) and (10%) level, respectively. Nobs= number of observations. Country and time fixed effects and other control variables in are not reported.

Table 5.10: Logit regression results of the probability for a migrant being high, medium or low skilled before and after reform in residence law 2003 (alternative specifications)

	2003-2005 X EEA	Pseudo R2	Log Likelyhood
	Exclude national variables		
Low education	0.095 ***	0.311	–93,449,110
	(0.036)		
Medium education	–0.006	0.123	–131,200,000
	(0.036)		
High education	–0.040	0.209	–94,319,581
	(0.032)		
	Focusing only on sending countries with more than 200 observations		
Low education	0.128 ***	0.307	–76,900,089
	(0.046)		
Medium education	0.001	0.118	–108,300,000
	(0.058)		
High education	–0.585	0.193	–76,000,695
	(0.323)		
	Excluding individual variables		
Low education	0.023	0.082	–50,825,903
	(0.041)		
Medium education	0.108	0.075	–79,237,040
	(0.068)		
High education	–0.106	0.090	–69,137,163
	(0.067)		
	Only 20 65 year olds		
Low education	0.149	0.093	–40,083,076
	(0.371)		
Medium education	0.120	0.100	–70,496,821
	(0.073)		
High education	–0.532	0.142	–60,769,364
	(0.320)		

Source: Austrian Labour Force Suvey (pooled values 2004-2007), WIFO-calculations. – Reference group are migrants from countries excluding former Yugoslavia, table reports marginal effects of equation 4.1, values in brackets are (cluster corrected) standard errors of the estimate, ***, (**) and (*) signify significance at the 1%, (5%) and (10%) level, respectively. Nobs = number of observations. Country and time fixed effects as well as other control variables are not reported.

To address these issues, in tables 5.9 and 5.10 we thus present estimation results for a number of alternative specifications of equation (5.1) for both the effects of EEA-accession (table 5.9) and reforms of residence law in 2003 (table 5.10). In particular in these tables report marginal effects for the period-EEA interaction terms of specifications in which we limited our sample to migrants that settled in Austria permanently in the time period 1991 to 2002 in order to gauge the potential bias that may result from including migrants from 1988 to 1990 in our estimates. In addition we also present results of estimating equation 5.1 only for migrants coming from

countries for which we have more than 200 observations in our sample both for the EEA-accession and reforms of residence law in 2003. Furthermore, in a further extension we also present marginal effects when focusing only on the population aged between 20 and 64. Finally, we also present a set of results in which we excluded time varying sending country variables (i.e. GDP per capita, share of low skilled population, infant mortality and the Gini-coefficient) from the estimation as well as a specification in which we excluded individual variables (i.e. age, age squared, gender marital status and the dummy for children), to assess the potential impact of co-linearity of these variables with our period – EEA interaction terms.

As can be seen from the results of these perturbations in our specification, the impact of these changes is only minor and provides only few additional insights. As with the results above in all results reported we find that after the EEA-accession the share of migrants with a low educational attainment level that settled in Austria from the EEA countries reduced significantly relative to migrants from other countries. Additionally, these results, however, also indicate that this shift away from low skilled migrants may have been associated with an increased share of medium skilled migrants from the EEA in particular from the time period 1997 onwards. When focusing on countries, which provide more than 200 observations in our data set, our estimates for treatment effects are significant in this case.

Similarly also regressions analyzing the impact of reforms of residence law in 2003 on the skill structure of migrants from third countries reconfirm most of our previous findings. These results, however, slightly strengthen the conclusion of a worsening skill structure of migrants after the reforms, since both when excluding sending country variables as well as when focusing only on the large migrant groups in Austria we find a significant increase in the share of low skilled migrants settling in Austria after 2003, while as above there is no significant impact on the reforms on the share of medium or high skilled migrants.

5.7   Conclusions

The results of this chapter thus suggest that after EEA-accession the skill structure of permanent migrants from the EEA relative to that of migrants from other countries improved. We find highly robust evidence that the share of low skilled permanent migrants from the EEA to Austria reduced relative to the share of low skilled permanent migrants from other countries after Austria's accession to the EEA. With respect to the reform of residence law in 2003, by contrast, our results are much less robust, with some significant results even pointing to an unexpected negative impact of these reforms on the average skill structure of permanent migrants, with increased shares of low skilled permanent migrants from countries outside the EEA. Our interpretation of these results is that the implicit positive impact of the reforms in the migration regime were countervailed by an increased demand for low skilled migration in other areas of permanent migration from third countries, which are unaffected by quota. This reduces the chances of identifying effects on permanent migration, since the reform only covered around one third to one sixth of the actual migratory moves for residence purposes from third countries to Austria.

Our results thus suggest that liberalized migration can have a positive impact on the education structure of permanent migrants if the previous migration regime was strongly focused on low skilled migrants. The results also present case study evidence to warn that reforms of migration law that provide privileged access of highly skilled permanent migrants may not provide the expected results if other elements of the regulation system governing migration counteract these developments.

To what degree can these results be generalized to other countries or time periods (such as for instance the freedom of movement of labour that will be granted to citizens of the new member states if the EU)? We would argue that in all likelihood it is too early to draw firm conclusions on this issue. As pointed out in the introduction there is only very little formal evaluation literature that analyses the effects of changes in migration policy on migration outcomes. Countries, however, differ substantially in their migration laws as well as labour market institutions and these institutions also change over time. It is also likely that the effects of individual migration policies are shaped by the interactions of a number of these institutions. Thus it is hard to tell from one case study alone, which of our findings are general and which are specific to the particular institutional environment of Austria in the time period analyzed in this paper.

6.   Summary and Conclusions

In this project we focus on three of sets of issues related to the qualification structure of migration to Austria:

- First, we want to know how the skill structure of the foreign born in Austria compares to other EU-countries in the light of more recent data from the years 2006 and 2007 taken from the European labour force survey and what factors shape the decision of migrants of different education levels to settle in a country.
- Second, we want to compare differences in labour market integration of the foreign born relative to natives between Austria and other EU-countries and to analyze to what degree the differences found can be explained by differences in the demographic and skill structure of migrants.
- Third, we analyze how changes of the Austrian migration law since the mid 1990's impacted on the qualification structure of migrants to Austria.

6.1   Results with respect to the skill structure of migration and settlement motives

With respect to the first question in comparison to the 13 EU-countries[68] for which we have data the skill structure of foreign born in Austria is characterized by a high share of medium skilled migrants and a low share of highly skilled migrants. At the same time the share of low skilled foreign born is slightly lower in Austria than in other EU-countries, but high relative to the education structure of natives. 46.7% of the foreign born population in Austria has a medium educational level. Behind the UK this is the second largest share in the EU 13. At the same time the share of high skilled migrants is only 16.5% of the total foreign born population, which is the third lowest. The shares of high skilled migrants were lower only in Italy and Greece. The share of low skilled foreign born is 36.5% in Austria and is the eighth lowest among the EU 27. This thus points to a rather unfavorable position of Austria with respect to the skill structure of the foreign both relative to other EU-countries, that in their vast majority manage to attract more high skilled foreign born, as well as relative to the skill structure of natives, that substantially more often have a medium skill level than the foreign born.

Although our data are thus consistent with the large body of recent comparative empirical evidence they also suggests a moderate improvement in the relative position of Austria with respect to the skill structure of migration in recent years. While previous studies focusing on the years 2000/2001 find that Austria has the lowest share of high skilled migrants among the OECD countries, our more recent data suggests that since then Austria has at least overtaken Greece and Italy with respect to this indicator.

In addition these particularities of the education structure of foreign born in Austria are closely associated with the particularities of labour demand (in particular with respect to the high share of medium education levels among the foreign born) as well as more low skilled

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[68] These are the 15 EU-countries that were members already before 2004 excluding Germany and Ireland

migrants from third countries and (to a lesser extent) more established migrant groups that reside in Austria for more than 10 years.

These findings are also confirmed by a shift share analysis of the skill structure of migrants. This analysis, however, also indicates that the larger part of the differences in skill structure between Austria and the EU is due to the selection of migrants rather than to an unfavorable country of birth structure of the foreign born. Among the pool of migrants in the EU form a given country, Austria generally selects the less qualified. The only exception to this is the low share of high skilled migrants, which is due almost to equal parts to an unfavorable country structure as well as to negative selection. Furthermore, our results also suggest that more established migrants contribute more strongly to selection than recent migrants and thus imply some change in selection of migrants in recent years. This also points to the role of migration history in shaping the skill structure of foreign born. From a policy perspective the results thus underline the importance of changing the mechanism of selection of migrants by skills if a more highly skilled structure of the foreign born is sought for.

To identify the causes for this strong selection of mostly low and medium skilled migrants to Austria we analyze the location choice of migrants to the EU 13. The results indicate that the location decisions of migrants in the 13 EU-countries considered are mostly governed by income opportunities, labor market conditions (like unemployment or the ease of access to the labor market), ethnic networks, a common official language as well as the design of the tax system (tax and social security rates, progressivity of the tax system). We do, however, not find strong evidence for the hypothesis that migrants are attracted to countries or regions with generous welfare benefits in Europe.

In particular, with respect to the location decisions of highly skilled workers we find that these are generally more attracted to larger regions, especially capitals, with good income opportunities. Ethnic networks of other highly skilled migrants from the same country of origin already living in the region also increase the attractiveness of a region for highly skilled migrants. Ethnic networks of migrants with lower skill levels do, however, not decrease the attractiveness of a region (except for migrants from the EU 15). The same holds true for networks in neighboring regions, as well as networks in second neighbor regions. Thus, as in previous studies in the literature, we conclude that networks are among the main factors determining the location choices of highly skilled migrants.

Language knowledge also plays an important role for highly skilled migrants' location decisions: the odds of a highly skilled migrant moving to a country which shares a common official language with his home country are – all else equal – 2.3 to 5.7 times larger. Easier access to the labor market also increases the probability of choosing a specific country/region for migrants outside the EU 15. However, the effect is largest for low and medium skilled individuals. Highly skilled migrants are also attracted to regions with lower taxes and a lower progressivity of the tax system, however less so than migrants with medium levels of education. The same holds true for the quality of the schooling system. Concerning other variables used to capture the generosity of the welfare system, our regressions (except

for the EU 12 subsample) show that a larger pension replacement rate increases the probability of moving to a region for highly skilled individuals. In general, we however find only weak support for the welfare magnet hypothesis among high-skilled workers.

The results do not indicate any clear-cut evidence for the scope of economic policy to affect the skill composition of migrants. Almost all variables controllable by public policy (e.g., the design of the tax or welfare systems, the ease of labor market access for foreigners) which positively affect the probability of highly skilled migrants moving to a region also increase the probability of medium and low skilled migrants choosing this region. Options to increase the skill level of migrants by creating incentives for more highly skilled workers must thus be found outside the scope of the tax and welfare policies.

We, however, also find that skill-differentiated ethnic networks have the largest effect on individuals with the same skill level. i.e., ethnic networks of low skilled migrants mainly attract other low skilled migrants, while ethnic networks of high skilled migrants increase the attractiveness of a region for other highly skilled migrants. This implies that a given skill structure among established migrants from a specific source country will be "handed down" to future generations of migrants from the same country – thus in a sense "perpetuating" the skill structure in the absence of skill-based regulation and selection. This suggests that there is a lock-in effect with respect to the skill structure of migration from a particular country. Depending on the stock of migrants from a specific sending country it may thus take a long time before and substantial efforts before the skill structure of migrants from a specific country can be changed perceptibly, so that regulation must be sustained for a long period if the share of highly skilled migrants is to be increased, and the possibility of policies to change the migrant skill structure rapidly must at least be questioned.

6.2   Results with respect to over- and under-qualification

With respect to the second set of issues there are clear signs of foreigners being disadvantaged relative to natives in terms of employment as well as over- and under-qualification rates both in Austria and the EU 13. These differences between natives and foreigners are, however, larger than in other EU-countries only with respect to employment rates, which is in turn primarily due to higher employment rates among natives in Austria than in other EU 13-countries (i.e. the EU 15 excluding Germany and Ireland), rather than to lower employment rates among foreigners. The employment rate among natives was 72.2% in Austria in the average of the years 2006 and 2007 and thus (significantly) by 5.2 percentage points higher than in the average EU 13-country, while the employment rate of the foreign born, was 64.2% and thus 0.5 percentage points (and statistically insignificantly) lower than in the average of the EU 13.

Furthermore, significant differences between the foreign born residing in Austria and in other EU-countries exist only with respect to under-qualification rates. Among the EU 13-countries Austria is a country with about average over-qualification rates among natives. Applying the methodology to measure over- and under-qualification proposed by the OECD (2008) 8.7%

of the Austrians work in occupations that require skill-levels below their education level relative to 8.9% of the natives in the EU. This is the 6th highest share in the EU 13 and slightly below average over-qualification rates among the foreign born (15.8% in Austria, 17.0% in the EU, 4th highest share in EU 13 – see figure 2). Thus also the native-foreign differentials in over-qualification are slightly lower in Austria than in the EU 13 average and rank 6th highest among the EU 13-countries.

By contrast under-qualification rates (with 35.6% for native and 27.8% for foreign born) are substantially below the EU 13 average (of 38,7% and 31.7%, respectively) of for both natives and foreign born in Austria. The foreign-native differential in this respect is only slightly (and statistically insignificantly) higher than the EU 13 average, ranking 4th highest among the EU 13.

From a policy perspective these results thus suggest that on the one hand policies aiming at increasing employment rates among the foreign born in Austria are even more important than in other EU-countries, since this is the indicator where differences to other EU-countries are largest. On the other hand policies aiming at improving skill transfer (both with respect to formal and informal skills) seem to be of an equal importance as in other EU-countries, since here problems (both with respect to over- and under-qualification) are of a more comparable magnitude.

We, however, also find that the majority of the differences in employment over- and under-qualification rates between foreign born residing in Austria and other EU-countries can be explained by differences in characteristics between the foreign born residing in Austria and in other EU-countries. In particular the marked differences in the education and country structure of the foreign born contribute strongly. Thus after controlling for differences in migrant characteristics the foreign born in Austria are neither better nor worse integrated into the labour market in Austria than in the EU 13.

According to the results the largest part of the differences in over- and under-qualification rates of the foreign born between Austria and the EU can be explained by differences in characteristics between the foreign born in Austria and other EU 13-countries. These differences account for almost 6.1 percentage points of the total 9 percentage point difference in the under-qualification rate between the foreign born in other EU-countries and Austria, while it contributes 1.3 percentage points to the 2.4 percentage point difference in over-qualification rates among foreign born in other EU 13-countries and Austria.

This points to the important role of migration policy in securing an adequate labour market integration of the foreign born. A higher selectivity of migration policy could also contribute to reducing problems of integration of the foreign born. Here in particular attracting more highly skilled migrants could contribute to reducing foreign-native differential in employment as well as over- and under-qualification rates.

The situation is somewhat different with respect to employment rates, however. Here on account of characteristics employment rates among the foreign born in Austria should

actually be by 1.9 percentage points higher than in the other EU 13-countries if the parameters governing employment probabilities were equal across both regions. The higher employment rates of the foreign born in the EU than in Austria can thus not be explained by differences in migrant characteristics and may thus be attributed to either a different behavior of migrants, or difficulties in skill-transfer or discrimination.

In addition, large differences – that cannot be explained by differences in demographic structure - exist in all indicators between natives and foreigners both in Austria and the EU. Our results suggest that both in the EU 13 as well as in Austria foreigners have characteristics that – if they were treated in the same way as natives on national labour markets – would suggest oppositely signed native-foreign differentials. Thus, based on characteristics alone, foreign born in Austria should have employment rates that are by 4.0 percentage points higher and over- and under-qualification rates that are by 0.2 and 0.6 percentage points lower than those of natives. The observed differences are thus entirely due to unexplained differences. This thus points to the continuing importance of integration policies with respect to improving labour market integration of the foreign born.

The underlying regression results for these decompositions also point to a number of areas in which this discriminatory part of native-foreign differentials is particularly pronounced both in the EU 13 and in Austria and could be priorities for policy makers. In particular

- Educational attainment (and to a lesser degree age) has a stronger impact on the respective probabilities of employment as well as over- and under-qualified employment for natives than for foreigners. This implies that native-foreign differences are particularly pronounced among the more qualified. While Austria only differs marginally from other EU 13-countries in this respect, this points to the particular problems of skill transfer of highly skilled foreign born workers in European labour markets. In consequence highly skilled migrants are likely to profit disproportionately from measures directed at improving the transfer of skills across borders.

- Native-foreign differentials are more pronounced for females than for males (or equivalently gender differences are more pronounced among foreign born) with respect to all indicators, thus indicating particular disadvantages of foreign born females. Here with respect to employment and under-qualification rates gender differences are lower in Austria both for natives and foreign born than in the rest of the EU, while they are larger than in the rest of the EU for the foreign born in Austria with respect to over-qualification.

- the foreign born in other EU 15-countries are somewhat of a special group, since their employment rates and even more strongly their over-qualification rates are significantly lower and higher with respect to under-qualification than for the average foreign born. This thus indicates that skill transfer within the EU is significantly easier than from countries outside the EU, and thus provides evidence of the high level of labour market integration among the EU 15. At the same time this does not apply to those born in the member states of the EU that joined since 2004 (i.e. the NMS 12) and thus suggests that with

respect to these countries there is still some room to improve the mutual acceptance of skills and degrees.

6.3 Results with respect to policy changes

With respect to the third issue we focus on the accession to the European Economic Area (EEA) in 1994, which liberalized immigration and labour market access from all member states of the EEA, and reforms of the foreign residence law which went into effect on 1st of January 2003 and aimed at increasing the share of high skilled migrants from third countries to Austria. The reason for this is that these reforms may also by of a wider policy interest in the light of future challenges to the Austrian migration regime and recent trends in international migration policy. In particular in 2011 Austria will liberalize its migration with the new member states of the EU. The accession to the EEA – although it concerned a set of countries that differ substantially from the new member states in terms of structure and wealth as well as occurring in a rather different institutional environment - thus represents a valuable historical example against which the potential effects of liberalization of migration and labour market access for the new member states can be assessed. Furthermore, a number of EU-countries have recently put in place policies that are intended to increase the share of high skilled migrants and migration experts have long argued that Austria should aim to attract more high skilled migrants. The effectiveness of previous reforms, however, has rarely been formally evaluated in the literature and only very little is known about the issue of which policy measures are most likely to contribute to a higher selectivity of migration regimes. Thus the experiences of the reform in residence law in 2003 may serve as one benchmark case for future reforms of migration law both in Austria as well as in other countries.

Our results suggest that after accession to the EEA the skill structure of permanent migrants from the EEA increased relative to that of permanent migrants from other countries. We find highly robust descriptive and econometric evidence that the share of less educated permanent migrants from the EEA to Austria reduced relative to the share of low skilled permanent migrants from other countries after Austria's accession to the EEA.

With respect to the reform of foreigner law in 2003, by contrast, our results are much less robust and indicate only few significant changes. Our interpretation of these results is that the implicit positive impact of the reforms in the migration regime in 2003 was countervailed by an increasing share of low skilled migration not covered by residence quota.

Our results thus suggest that liberalizing migration can have a positive impact on the education structure of permanent migration if the previous migration regime is strongly focused on less skilled migrants and also provide case study evidence to warn that reforms of migration law that provide privileged access to highly skilled migrants may not provide the expected results if other elements of the system of regulations governing migration counteract these developments.

Although these results are suggestive it is also too early to draw firm conclusions from them with respect to the likely impact of either liberalization of migration and labour market access to the new member states in 2011 and partial migration law reforms on the skill structure of migrants. This is because there is only very little formal evaluation literature of the effects of changes in migration policy on migration outcomes and countries differ substantially in their migration laws as well as labour market institutions and these institutions also change over time. It is also likely that the effects of individual migration policies are shaped by the interactions of a number of these institutions, so that inferring from one particular case of liberalization to another is always risky given that it is hard to tell from one case study alone, which of our findings are general and which are particular to the institutional environment of Austria in the time period analyzed here.

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Appendix

Appendix 5.1 (To Chapter 5): List of developed countries (based on an average Human development index of 0.75 or more)

Country	Average HDI (95-05)	Country	Average HDI (95-05)
Luxembourg	0.96	Antigua and Barbuda	0.86
Liechtenstein	0.95	United Arab Emirates	0.86
Norway	0.94	Bahrain	0.86
Hong Kong, China (SAR)	0.94	Slovakia	0.86
Canada	0.94	Bahamas	0.85
United States	0.94	Cuba	0.85
Netherlands	0.94	Poland	0.85
Switzerland	0.93	Estonia	0.85
Andorra	0.93	Hungary	0.85
Sweden	0.93	Croatia	0.84
Japan	0.93	Oman	0.84
Iceland	0.93	Seychelles	0.84
Australia	0.93	Lithuania	0.84
France	0.93	Libyan Arab Jamahiriya	0.84
Belgium	0.92	Chile	0.84
Denmark	0.92	Saint Kitts and Nevis	0.83
Finland	0.92	Argentina	0.83
Austria	0.92	Uruguay	0.83
Spain	0.92	Bulgaria	0.83
United Kingdom	0.92	Latvia	0.83
Germany	0.91	Montenegro	0.83
New Zealand	0.91	Costa Rica	0.82
Ireland	0.91	Saint Lucia	0.82
Italy	0.91	Mexico	0.82
Greece	0.90	Serbia	0.82
Israel	0.90	Dominica	0.81
Qatar	0.90	Trinidad and Tobago	0.81
Slovenia	0.90	Grenada	0.81
Brunei Darussalam	0.90	Romania	0.81
Barbados	0.89	Bosnia and Herzegovina	0.81
Cyprus	0.89	Venezuela (Bolivarian Republic of)	0.81
Singapore	0.89	Albania	0.81
Kuwait	0.88	Russian Federation	0.81
Czech Republic	0.88	Saudi Arabia	0.81
Portugal	0.87	Macedonia (the Former Yugoslav Republic of)	0.80
Malta	0.87	Panama	0.80
Korea (Republic of)	0.87	Lebanon	0.80

Source: UNIDO, WIFO-calculations.