Educational Mismatch Among Immigrants in the Czech Republic – Selected Issues[1]

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Educational Mismatch Among Immigrants in the Czech Republic – Selected Issues. Although the share of immigrants in the CR is in comparison with other EU states relatively small, the number of foreign nationals quadrupled over the past two decades. The most important challenge of integration of immigrants into the labour market is releasing their full skills potential, which has also a positive impact on integration and social cohesion. The aim of this article is to examine educational mismatch of immigrants on the basis of the CZ-LFS and the 2014 CZ-LFS ad-hoc module data. The immigrants in this study are divided according to the country of origin into three groups: Slovaks, EU and non-EU countries nationals. After overview of immigrant population and its characteristic, binary logistic regression models exploring the odds of working in high-skilled occupations, empirical and subjective over-education are described.
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Introduction

Skills mismatch is a widespread phenomenon in Europe and has become an important subject of debates on future development in European labour markets. Matching skills and jobs is gaining importance with rapid technological change, increasing global competition and fast ageing of European population. (CEDEFOP 2010) One of the skills mismatch is the educational mismatch which is the subject of this article. When people from the major population have difficulties to find jobs matching their potential, the position of immigrants is probably even more difficult. Though the incidence varies substantially across countries, there is general consensus in the literature that immigrants are more overqualified than the natives in general. According to Aleksynska and Tritah (2013), 22% of immigrants face over-qualification in the Europe. There are various explanations why: from discrimination in labour market to imperfect transferability of human capital across borders. (Piracha – Vadean 2012) For at least the past 15 years the integration of immigrants has been a prime policy challenge in many OECD countries. The process of

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integration faces various challenges and perhaps the most important is releasing the immigrants' full skills potential. Why is it an issue? Skills of immigrants that are not used represent a wasted human capital and may also have a negative impact on integration and social cohesion and also contribute to persisting wage gaps. (Chiswick – Miller 2007) Labour market integration of immigrants includes the identification, the activation and the development of their skills and is often seen as a criterion of good integration. (OECD 2014) Studying immigrants' overqualification is one of the ways their assimilation can be observed (besides wage differentials and rates of labour participation).

Our study has three main research objectives. The first research objective is to investigate whether immigrants in the Czech Republic more often work in high-qualified professions compared to domestic workers. The second objective is to investigate whether a range of theoretically based assumptions affect the empirical incidence of over-education between groups of immigrant workers. We expect that length of stay, marital status, type of employment, region of work and age will have some effect on over-education. The third objective is to explore the factors behind the subjective perception of overqualification.

The outline of this study is structured as follows. First, we define what educational mismatch is and summarise current knowledge about educational mismatch among immigrants in the Czech Republic. Then we briefly describe data used in this study, which are CZ-LFS data and 2014 CZ-LFS ad-hoc module 'Labour market situation of immigrants and their immediate descendants'. Concepts used in this study are also specified. Overview of the immigrant population in the Czech Republic is followed by description of educational levels, incidence of educational mismatch and occupational structure. In the last chapter binary logistic models that examine odds of working in high-qualified job, odds of immigrants of being over-educated in the Czech labour market and immigrants' odds of feeling subjectively overqualified. In the end main findings are summarized.

Review of the literature on immigrants' educational mismatch

What is educational mismatch?

Educational mismatch occurs when the required level of education for a particular job diverges from the employee's attained level of education. Mismatch between level of education and particular job can be vertical or horizontal. While *vertical mismatch* is a situation in which the level of education or skills is lower or higher than the required level of education or skills, *horizontal mismatch* is a situation in which level of education or skills matches job requirements, but the type of education or skills is inappropriate for the current job. (CEDEFOP 2010) Literature describes different types of

mismatch between job and education (for example (Sloane 2014)): educational mismatch, qualification mismatch and skills mismatch. *Educational mismatch* means that an individual has completed less/more years of education than current job requires. It is usually defined in terms of years or by acquired level of education. *Qualification mismatch* means that an individual holds a lower/higher qualification than current job requires. It is defined in terms of credentials, but also comprises qualification received outside of formal system of education (e. g. skills, experience, and professional/product certification). *Skills mismatch* stands for situation when an individual has fewer skills or cannot fully use acquired skills and abilities in the current job.

There are three different ways in which the divergence from required level has been quantitatively measured: objective, empirical and subjective. (Hartog 2000; CEDEFOP 2010; Piracha – Vadean 2012) Each method of measurement has its advantages and weaknesses.

Job analysis method (objective approach) relies on the information about job requirements contained in the occupational classification documents (e.g. International Standard Classification of Occupations (ISCO)). Although this method is considered as standardized tool, disadvantage is that it cannot capture the dynamic nature of job structure and also some measurement errors can result from translation of job requirements into a single schooling variable.

In *realized matches method* (empirical approach), the estimate is derived from differences in the actual education of an individual within an occupation relative to the mean or modal level of education of all people employed in that occupation. The advantage of this method is that it allows direct comparison of immigrants with major population. Criticism of this method argues that the realized match does not reflect only requirements, but is also the result of labour market supply and demand.

Finally, in w*orker self-assessment method* (subjective approach) workers are asked about the required education level of their job in a questionnaire. The question can be both direct and indirect; exact phrasing varies substantially across studies. Using this method has the advantage of drawing on the current available knowledge, but respondents may have tendency to overstate the requirements of their jobs and upgrade the status of their position. (Hartog 2000) The use of this method might be problematic for immigrants, because it may reflect also self-perception of their own discrimination in the labour market.

It is not very surprising that different methods bring different results. The percentage of mismatched immigrants differs with respect to the measurement method employed; and it is strongly linked to the definition of job-education mismatch as well. Some studies show that mismatch is less frequent when self-

reported rather than objective measures are used. (e.g. in study of immigrants in Spain, see (Sanromá et al. 2008))

The choice of method is usually dictated by data availability. In this study we use CZ-LFS data and 2014 CZ-LFS ad-hoc module data, which enable us to use two of them – realized matches method and worker self-assessment method.

Explanations of educational mismatch among immigrants

Generally, if the labour market is assumed to work efficiently, there is no obvious reason for an educational mismatch to occur. Then, what are the reasons for this divergence? According to Tijdens and van Klaveren (2012) there are six theoretical explanations of educational mismatch among immigrants. The first explanation refers to the assumption that entry-level workers might occupy jobs for which they are over-educated and later on move to jobs, which better match their education. Thus years spent in the host country should increase the probability to have job that matches their education. The second explanation refers to the assumption that workers, who have experienced career breaks are more likely to be in jobs for which they are overeducated (e.g. re-entering housewives). The third explanation refers to a job allocation frictions that are related to career mobility – an individual accepts a lover-level job if the probability of promotion is higher. The fourth theoretical explanation is associated with a lack of transparency with regard to diplomas or transferability of credentials. The fifth explanation lays in the poor abilities of an individual worker, in particular the worker's mastery of the host country language. And the sixth explanation refers to allocation friction due to labour market ethnic discrimination.

The determinants of over- and under-education in the literature vary. These factors can be generally divided into an individual-specific reasons (e.g. education, work experience, recognition of diplomas), home country determinants (language proximity, quality of schooling) and destination country determinants (income level, general level of unemployment, labour market flexibility, etc.) and they can both increase or decrease the probability of over-education. (Aleksynska – Tritah 2013)

Generally, there are consistent findings across studies that young people, women, immigrants and people who are not married are more likely to be over-schooled. (Leuven – Oosterbeek 2011) Literature review indicates that the most frequent characteristics that cause immigrants to be more likely to be over-educated are the residence period, the work experience, the knowledge of host country language and origin in country that is economically and culturally different. (Piracha – Vadean 2012)

An overview of the studies on immigrants over-education in the Czech Republic

In the context of the Czech Republic, the immigrants are subject of interest of both qualitative and quantitative studies. In these studies, the relationship between education and qualification is usually just one of the sub-themes.

Immigrants and their situation are more often studied from the qualitative perspective. (For example Drbohlav – Drzúrová 2007; Drbohlav et al. 2010; Ezzeddine 2012) The latest qualitative study by Leontiyeva and Pokorná (2014) focused directly on factors restraining from utilization of immigrants qualification in the Czech labour market, however, only the immigrants from non-EU countries were interviewed. Methodology of this study was based on the interviews with immigrants, employers and also with regional employment office workers. Most of the immigrants came to the CR due to the deteriorating economic or political situation in their country of origin. Finding job that matches immigrants' education depends on many factors: the level of disintegration and related urgency of leaving home country, financial reserves, field of profession and a job experience from home country are crucial. The respondents with poor knowledge of the Czech language observed low qualified profession as their only option, though low social status connected with low qualified profession is not perceived as non-problematic. While overqualification of applicant is usually undesirable from the employer point of view, overqualification of immigrants, who don't have any other option, is perceived as a guarantee of 'quality' and some employers especially in manual professions prefer to hire an overqualified immigrant instead of a domestic worker, whose qualification matches the job position. The important point of this study is that nationality also shapes field employment. Immigrants from Vietnam form background for ethnical entrepreneurship, the Mongolian workers often find employment in manufacturing industry and a construction industry is connected with the Ukraine community. This leads to ethnicization of sectors and reproduction of ethnical segmentation of the labour market.

Several quantitative studies on immigrants were conducted in the past. These studies were usually focused on immigrants from specific countries. The most recent studies were conducted in 2011 and 2014. In 2011, a questionnaire-based survey (with 1000 respondents) targeted at five economically active non-EU nationality immigrant groups was conducted to gather information about the incomes and expenses of immigrants currently living in the Czech Republic, as well as the remittances they send abroad. (Leontiyeva – Tollarová 2011) In 2014, a study explored the degree to which Ukrainian labour immigrants utilise their skills in the Czech labour market. This study was based on two surveys targeted on two slightly different groups – a survey of non-EU

workers from 2006 and a survey of economically active foreigners from 2010 (both with approx. 1000 respondents). (Leontiyeva 2014)

Another study based on CZ-LFS data (from years 1999 – 2012) focused on employment outcomes of immigrants in the Czech Republic. In this study, the immigrants were divided into those from the post-communist countries and the Western immigrants and analysed within three years cohorts. With respect to occupational skill levels, the proportion of immigrants from the post-communist countries in low-skilled occupations is in the year of arrival notably higher (13-26% upon arrival) than for Czechs (between 7-5%), but this share is declining as the duration of stay in the country increases. In comparison with Czechs (36-41%), the share of immigrants from the Western countries in high-skilled occupations is about twice as high and it has been steadily declining during the past decade. The cohort view suggests that these immigrants leave high-skilled professions after a certain period of time, which can be explained by temporary managerial positions occupied by foreigners in multinational companies who then return home. (Münich 2014)

However, the disparity between the skills of immigrants and their occupation in the destination country is currently a well-researched topic in many Western countries; it is still an under-researched topic in the context of the Czech labour market. The aim of this article is to offer a comprehensive study on the educational mismatch among immigrants on the basis of current CZ-LFS data and 2014 CZ-LFS ad-hoc module targeted on immigrants.

Methods and data

Data and definitions

In this study, two main data sources were used: the Czech Republic Labour Force Survey (CZ-LFS) data for years 2011 – 2014 and the 2014 Czech Republic Labour Force Survey ad-hoc module 'Labour market situation of migrants and their immediate descendants'.

The LFS is the largest European household sample survey providing quarterly and annual results on labour participation of people aged 15 and over as well as on persons outside the labour force. The LFS defines the resident population as persons usually living in selected private households (not considering what kind of residence they have). The LFS, like all surveys, is based on a sample of the population. The results are, therefore, subject to the usual types of errors associated with the sampling techniques such as poor coverage of socially-excluded groups. Due to the fact that the survey is conducted within private households, there is under-representation of those who do not live in a household as the people living in communal establishments are not sampled. The scope of these caveats keeps within standards used in other EU countries and in addition, as the social and

economic inequalities are persistently low in the CR, the survey misses only a small share of the whole population.

Educational mismatch in this study is constructed as a realized-matches method (an empirical approach described earlier). Educational mismatch is constructed as a difference between the mode of education in particular profession and the education of the respondent working in a particular profession (on ISCO three digit level). When the mode and the level of education are equal, then the qualification of a respondent matches his/her education. When the modus in particular profession is higher/lower than the level of education, then the respondent is under-educated/over-educated.

Statistics are calculated using CZ-LFS data and are aggregated for the years 2011 – 2014 to accomplish higher reliability. Immigrants were divided into three groups according to country of birth. These groups are Slovaks, immigrants born in EU member states and immigrants born in non-EU member states. The reason to divide immigrants into these three groups lies in the assumption that country of origin and language proximity has impact on success in the Czech labour market. Dividing immigrants according to their country of origin membership in EU is based on the assumption that member countries to some extent coordinate domestic and international policies covering economic, environmental and social issues that facilitates the movement and integration of immigrants.

The most important findings are based on binary logistic regression models. Model 1 analyses odds of working in high-qualified job and explores how these odds differs between immigrants and Czechs. Model 2 analyses odds of being over-educated within population of immigrants in the Czech Republic and it gives us the answer on which factors contribute to over-education of immigrants. Model 3 is based on worker self-assessment of over-education and it enables us to examine the differences between empirically constructed over-education and its subjective perception. In models, only the respondents with a full-time job and not those in full-time education are included. In the first two models, we aggregated data for the years 2011 – 2014. The third model is based on the 2014 CZ-LFS ad-hoc module dataset only. The data were weighted to ensure that results represent the national population[3].

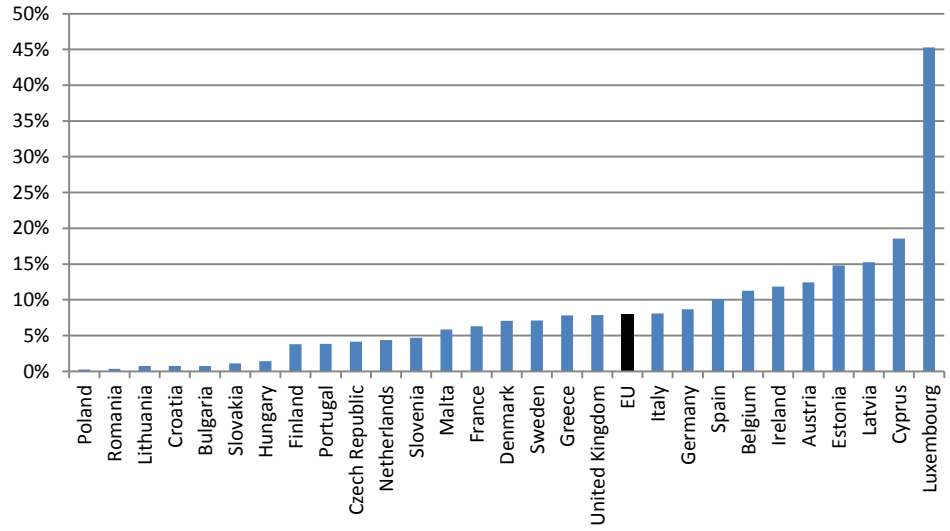
An overview of the immigrant population in the Czech Republic

In comparison with the other EU states, the share of foreign population in the total population of the country is only 4% in the Czech Republic, which is below EU28 average (8%). Countries with the lowest share of foreign

[3] Annual weight constructed as an average of quarter weights (for each year) was used.

population are Poland and Romania (0.3%, 0.4% resp.), and the highest shares are recorded in Luxembourg (45%), followed by Cyprus (19%).

Graph 1: **The share of foreign population in the total population** (2014)



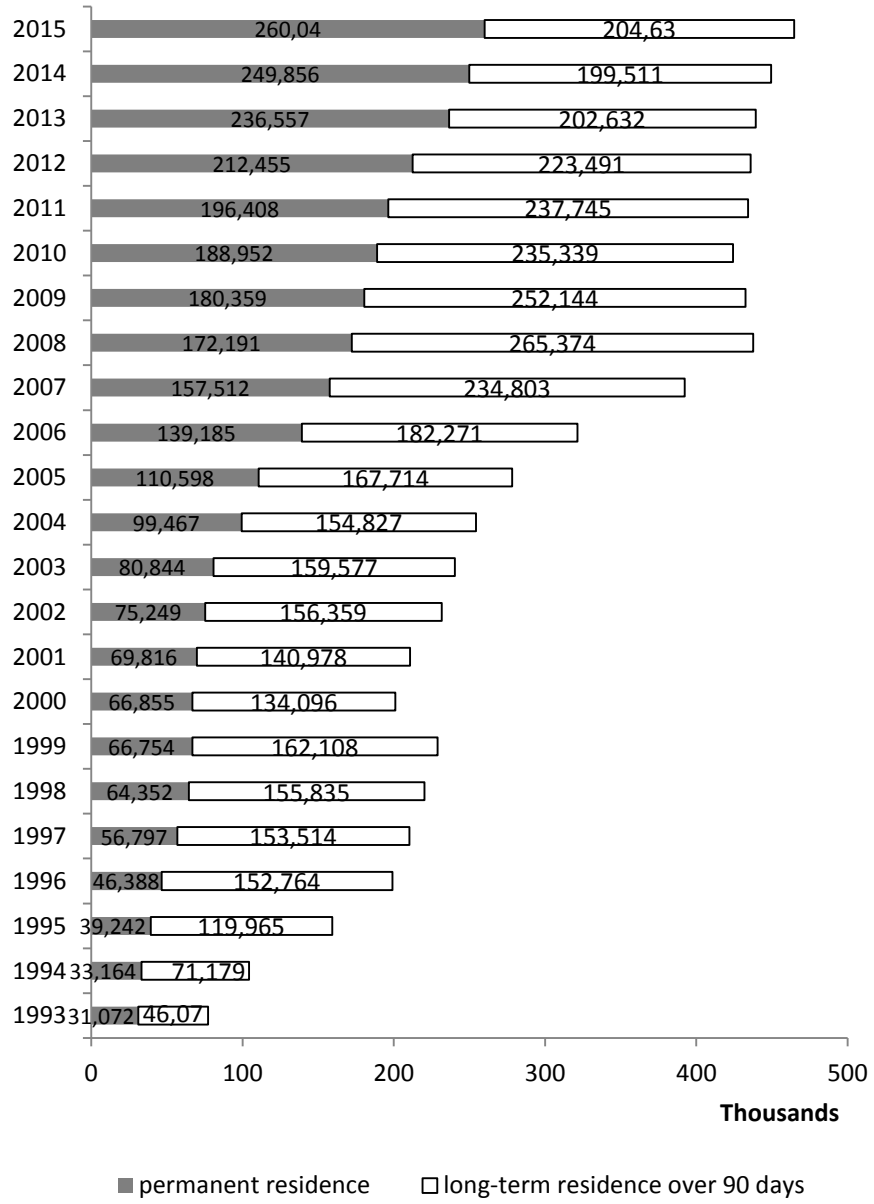
Source: Eurostat, http://ec.europa.eu/eurostat

Although the share of immigrants in the Czech Republic is relatively low, the number of foreign nationals in the Czech Republic more than quadrupled over the past two decades. It has been growing from about 100 000 in 1994 to more than 460 000 in 2015. Over this period, we could see two turning points that interrupted the stable growth of number of foreigners in the CR; first at the turn of 1999/2000 when the number of foreigners decreased by 28 000 due to the legislative change[4], the second, not so dramatic decrease has started in 2008/2009 perhaps due to the economic crisis. Over the same period, the share of immigrants with the permanent residence[5] is growing steadily.

[4] Act no. 325/1999 Coll., on the stay of foreigners in the Czech Republic. (Available in English: http://www.mvcr.cz/mvcren/article/asylum-and-migration-legal-framework.aspx)

[5] The permanent residence permit requires 5 years of uninterrupted temporary stay in the Czech Republic on a long-term visa and with a long-term residence permit. If the stay is for the purposes of studies, only a half of its duration is required. (Source: http://www.mvcr.cz/)

Graph 2: **The trend in the number of foreigners in the CR by type of residence** (1993 – 2015)



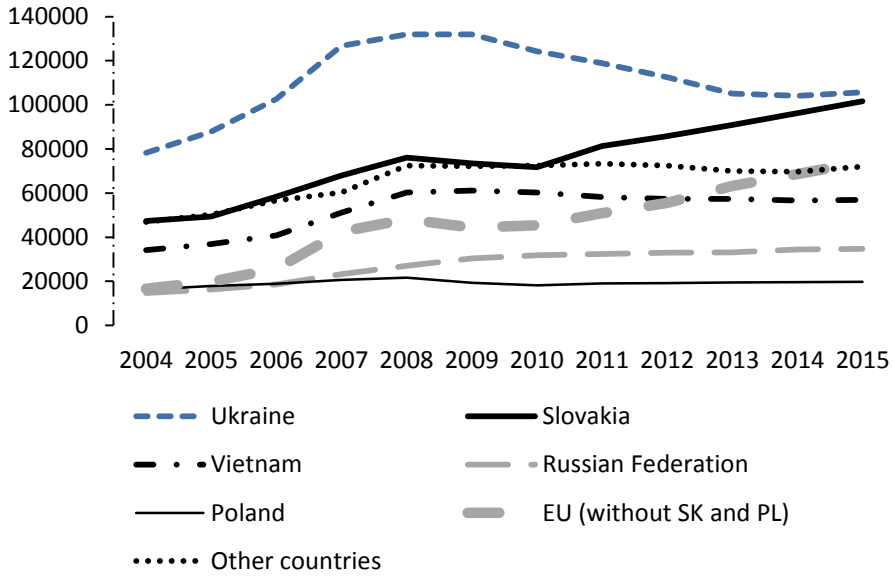
Source: Czech Statistical Office, https://www.czso.cz/csu/cizinci/cizinci-pocet-cizincu

Country of origin

Regarding national structure of foreigners in the CR, 42% of foreigners come from the EU member states. The most frequent nationalities include Ukraine with almost a quarter of all foreigners in the CR, followed by Slovakia (22%), Vietnam (12%), the Russian Federation (7%) and Poland (4%). These five countries constitute almost three quarters of countries of origin of the foreigners in the CR[6].

As we can see on the graph below, since 2004, which was the year when the CR became a member of the EU, the number of immigrants had been rising until 2008. The economic recession in 2008 – 2009 changed the flow. While the number of immigrants from Ukraine has been decreasing since 2009, the number of people from Slovakia as well as the other EU states has been rising since 2010.

Graph 3: **The foreigners in the CR by the most frequent citizenship** (2004 – 2015)



Source*:* Czech Statistical Office, www.czso.cz

[6] Source: Czech Statistical Office, Directorate of Alien Police Service, Ministry of the Interior of the CR. https://www.czso.cz/csu/cizinci/4-ciz_pocet_cizincu#cr

Economic status

Economic status of Czechs and all three groups of immigrants differ. Czechs and Slovaks in the Czech Republic have the same share of employed people (47%), but the share of unemployed people is twice as high among Slovaks (6%). Total share of employed people from EU countries is lower (43%) and the share of employed people from non-EU countries is higher (66%). Employment rates differ markedly by gender; in all four groups employment rates of women are significantly lower than men. Immigrant men have higher employment rates than Czech men and women from outside EU countries also surpass employment rates of Czech women.

Table 1: **The structure by economic status and gender**

	Czechs			Slovaks			EU countries			Non-EU countries		
	M	W	Total	M	W	Total	M	W	Total	M	W	Total
Employed	54%	40%	47%	58%	37%	47%	56%	29%	43%	78%	54%	66%
Unemployed	3%	3%	3%	6%	5%	6%	1%	2%	2%	4%	5%	4%
Economically inactive	43%	57%	50%	35%	58%	47%	42%	69%	55%	19%	42%	30%

Source*:* Czech Labour Force Survey data, 2011 – 2014, authors' calculations.

Type of employment

Among working Czechs, 83% are employed in wage-based or salaried work and about 17% have self-employment status. The share of employee positions among Slovaks is higher (87%) and for other immigrants it is lower (about 72% of immigrants from EU countries and 62% of immigrants from non-EU countries). The highest share of self-employed is among the immigrants from outside EU countries. This is probably due to high share of self-employed Vietnamese immigrants (more than 60%).

It is important to note that some employers in the Czech Republic sometimes use illegal form of employing workers under the shadow economy (so-called *švarc systém*) to have a supply of dependent work force outside employment relations. Under the shadow economy, the workers pretend to be independent entrepreneurs (using trade certification), while there is an employment relationship between an employer and an employee. The reason for this is that the employers don't have to pay a tax and insurance. The qualitative study (Leontyieva – Pokorná 2014) shows that this practice is used in the case of immigrant workers too.

Educational mismatch
Education levels

Immigrants in Europe tend to be overrepresented at both ends of the qualification scale and have on average slightly fewer years of education than the native-born. In recent years, the pattern of migration flows is changing towards more qualified migration. (OECD 2014) The Czech LFS data show higher share of immigrants with only compulsory education[7]. Considerably lower numbers of EU and non-EU immigrants have lower secondary educational level than among Czechs. This is apparently caused by the unusually high proportion of Czech adults with upper secondary education (rather unique in Europe). Among immigrants there is higher share of tertiary educated than in the Czech population.

Table 2: **Education levels among native Czechs and** im**migrants**

	Czechs			Slovaks			EU countries			Non-EU countries		
	M	W	Total	M	W	Total	M	W	Total	M	W	Total
Compulsory	3%	5%	4%	7%	9%	8%	6%	11%	8%	12%	14%	13%
Secondary	44%	29%	38%	39%	25%	34%	24%	23%	23%	24%	23%	23%
Upper secondary	33%	44%	38%	28%	39%	33%	26%	46%	32%	34%	35%	34%
Tertiary	20%	22%	21%	26%	27%	26%	44%	20%	37%	30%	28%	30%

Note: Only respondents with full time job and not in full-time education.
Source*:* Czech Labour Force Survey data, 2011 – 2014, own calculations.

The incidence of educational mismatch

Among the employed population in the Czech Republic 68% are well matched with their job, while 20% are over-educated and 12% are under-educated.[8] The shares of both over-educated and under-educated immigrants are higher in all three immigrant groups. A more pronounced mismatch is recorded among immigrants from outside EU countries (37% are over-educated and 18% under-educated). The mismatch among Slovaks is similar to that observed among immigrants from EU countries.

As is commonly the case, the share of educational mismatch differs markedly by gender (see Table 3). Educational mismatch is higher among immigrant women than among Czech women, and women from non-EU

[7] Education level in terms of ISCED classification are constructed as: Compulsory (ISCED 2 and lower), Secondary leading to the labour market (ISCED 3c), Upper secondary preparing for tertiary education (ISCED 3a,b + 4) and Tertiary (ISCED 5a,b+6+7).

[8] As described in the previous chapter, educational mismatch is constructed as the difference between the mode of education in a particular profession and the education of the respondent working in the particular profession.

countries are in a particularly disturbing situation, as almost half of them are over-educated.

Table 3: **Educational mis/match among native Czechs and immigrants by gender**

	Czechs			Slovaks			EU countries			Non-EU countries		
	M	W	Total	M	W	Total	M	W	Total	M	W	Total
Matched	68%	67%	68%	62%	60%	62%	57%	56%	56%	50%	38%	45%
Over-educated	21%	20%	20%	24%	26%	24%	27%	28%	27%	33%	44%	37%
Under-educated	12%	13%	12%	14%	14%	13%	17%	17%	17%	17%	19%	18%

Note: Only respondents with a full-time job and not in full-time education.
Source*:* Czech Labour Force Survey data, 2011 – 2014, author's calculations.

Table 4: **A comparison of empirical (realized matches) and subjective over-education rates among immigrants**

	Empirical					
	Slovaks		EU		Non-EU	
	Men	Women	Men	Women	Men	Women
Over-educated	23%	23%	26%	37%	32%	57%
Matched + under-educated	77%	77%	74%	63%	68%	43%
	Subjective					
	Slovaks		EU		Non-EU	
	Men	Women	Men	Women	Men	Women
Over-educated	13%	12%	21%	33%	14%	24%
Matched + under-educated	87%	88%	79%	67%	86%	76%

Note: Only immigrants with a full-time job and not in full-time education.
Source: CZ-LFS data 2014 and CZ-LFS Ad-hoc module 2014.

The scale of over-education varies not only in its explanatory variables, but also according to what method is used to measure it. (See table 4) According to a meta-analysis of studies focused on educational mismatch by Groot and Maassen van der Brink (2000) the highest estimates of over-education rates are produced by subjective methods, which are based on a self-assessment. Surprisingly, however, using both empirical and subjective methods on Czech data focusing on immigrants' over-education shows that empirical observation shows a larger share of over-education among immigrants than its subjective perception. A particularly large difference between the empirical and the subjective evidence of over-education can be observed among immigrants from non-EU countries. This finding confirms the assumption that immigrants are more often over-educated, according to empirical measures, because the

signalling function fails for foreign educational degrees. On the other hand, immigrants themselves do not feel over-educated (in terms of educational level, experience and skills) to the extent they ought to according to the realized matches method used here. It can be assumed here that immigrants often lack important language skills and therefore are in fact under-skilled even though they are formally over-educated. This hypothesis is built on previous research findings (e.g. Allen – van der Velden 2001) that qualifications and skill mismatch are two different concepts.

Occupational structure

The proportion of Czechs employed in high-skilled occupations (ISCO categories 1-3) is 36% for men and 40% for women. There are more managers among men, but there are more women than men in the category of professionals. The total percentage of men from EU countries working in high-skilled occupations (in the Czech Republic) is 56%, which is the highest share of men in managers and professionals categories. Women most often work in services and sales. Among Czech and Slovak women and women from EU countries the percentages working in this occupation are 22%, 21%, and 20%, respectively, but among women from non-EUcountries the figure is 32%.

Table 5: **The occupational structure of Czechs and immigrants**

	Czechs		Slovaks		EU countries		Non-EU countries	
	Men	Women	Men	Women	Men	Women	Men	Women
1 Managers	7%	3%	6%	4%	16%	5%	12%	2%
2 Professionals	11%	18%	16%	18%	27%	16%	14%	9%
3 Technicians and associate professionals	19%	19%	15%	14%	14%	14%	13%	13%
4 Clerical support workers	4%	17%	2%	12%	2%	12%	2%	9%
5 Service and sales workers	9%	22%	6%	21%	7%	20%	20%	32%
6 Skilled agricultural and fishery workers	2%	1%	1%	1%	1%	1%	0%	2%
7 Craft and related trade workers	28%	4%	23%	5%	14%	5%	23%	7%
8 Plant and machine operators, and assemblers	18%	8%	26%	15%	17%	13%	11%	8%
9 Elementary occupations	3%	7%	5%	9%	4%	14%	5%	18%

Source*:* Czech Labour Force Survey data, 2011-2014, author's calculations.

There are more Czech than the other two groups of women performing the occupation of clerical support and more non-EU women than the other two groups employed in elementary occupations. While EU men make up the largest of the three groups of men in the professional category, Czech and non-EU men are those most often employed as craft and related trade workers and Slovak men work mostly as plant and machine operators and assemblers.

Models

In this chapter, three models of educational mismatch based on binary logistic regressions are introduced. Binary logistic regression is a regression model where the dependent variable is dichotomous and can have two possible values, which are coded as '0' if the event didn't occur (referred to as a "failure') and '1' if the event did occur (referred to as a 'success'). The model is used to predict the odds of being a case based on the values of these predictors. Independent variables can be either continuous or categorical coded as indicator variables. Binary predictors are conventionally coded as 0 and 1 and treated as continuous. In logistic regression, regression coefficients represent the change in logit for each unit change in predictor. Logits cannot be interpreted intuitively, so it is rather the predictor's effect on the exponential function of the regression coefficient that is used for the purpose of interpretation. The odds ratio is defined as the odds that a particular outcome will be a success divided by the odds that it will be a failure. (Řeháková 2000)

As we expect there to be gender differences in our models, all three models are conducted separately for men and women. Descriptive statistics for the models are included in attachment.

Model 1 – The odds of working in a high-skilled occupation

Even though the number of tertiary educated immigrants is higher than the number of those with lower levels of education, immigrants overally (with the exception of men from OECD countries) are over-represented in professions that require a lower level of qualification. Model 1 analyses the odds of working in a high-skilled occupation. The dependent variable is constructed as 0 for low-qualified professions (comprising ISCO categories 4-9) and 1 for high-skilled professions (ISCO categories 1-3).

All independent variables included in Model 1 significantly influence the odds of working in a high-skilled job for both men and women. The most important predictor for both genders is level of education. People with a higher level of education have greater odds of working in a high-qualified job than people who left school after completing the compulsory level of education. This is not surprising, because people with a low level of education cannot, by

definition, work below that level. Conversely, people with a high level of education are more likely to be over-educated and less likely to be under-educated. (Piracha – Vadean 2012)

Model 1: **Work in high-skilled occupations**

	Men		Women	
	B	Odds ratio	B	Odds ratio
Secondary	0,553***	1,739	0,480***	1,616
Upper secondary	2,939***	18,904	3,152***	23,381
Tertiary	5,249***	190,360	5,316***	203,521
EU countries	0,141***	1,152	-0,351***	0,704
Non-EU countries	-0,542***	0,582	-1,490***	0,225
Slovaks	-0,111***	0,895	-0,362***	0,697
Middle age (30-49)	0,362***	1,436	0,493***	1,638
Elderly (50+)	0,358***	1,431	0,712***	2,038
Married	0,298***	1,347	0,094***	1,098
More than 40h/week	0,181***	1,198	0,140***	1,151
Constant	-3,644***	0,026	-3,971***	0,019
Pseudo R2 (McFadden)	0,374		0,330	

***p<0.001; **p<0.01; *p<0.05
Note 1: Only respondents (immigrants and Czechs together) with a full-time job and not in full-time education.
Note 2: Reference categories are: education – compulsory country – Czech; age group - youth (under the age of 29); marital status – unmarried; working hours - 40 h/week and less.
Source: CZ-LFS data 2011 – 2014

The first difference between men and women is observed in the odds of working in a high-skilled profession according to country of origin. Only men from EU countries have 1.2 times higher odds than Czech men of working in a high-skilled profession. Women from EU countries have lower odds than Czech women of doing so. The second-lowest share of tertiary educated is also found among women from EU countries and the difference between EU men and women is very wide – 44.3% of EU men are tertiary educated, but only 19.8% of women have this level of education. Workers from Slovakia are only slightly disadvantaged in the Czech labour market. They have lower odds of working in a high-skilled profession than Czech workers, but higher odds of doing so than men from non-EU countries. Although the share of tertiary educated among immigrants is in general higher than among Czech men and women (with the exception of EU women, see Table 2), the odds of immigrants working in a high-qualified job are lower.

Another difference between men and women relates to age groups. Compared to young men (under the age of 29), middle-aged and elderly men

have 1.4 times higher odds of working in a high-skilled profession and the odds are the same for these two groups. On the other hand, middle-aged women have 1.6 times higher odds and elderly women have 2 times higher odds than young women, so the odds of working in high-qualified professions rise with age.

Other predictors are similar for both genders. Married workers have greater odds of working in high-skilled professions than unmarried workers and those who work more than 40 hours a week have slightly higher odds than those who work less.

Model 2 – Realized matches

What factors contribute to the over-education of immigrants? Model 2 analyses the odds of being over-educated in the population of immigrants in the Czech Republic. The dependent variable is constructed as 0 for people whose profession matches their education and 1 for those who are over-educated for their current job position. As mentioned in the previous chapter, over-education is defined as the difference between the modus of education and the education of the respondent in a particular profession (the method proposed by. (Kiker – et al. 1997)

In all the immigrant groups in Model 2 with every additional year spent in the Czech Republic the odds of being over-educated decrease. The model proves that immigrants who live in the Czech Republic for a longer period of time have higher odds of finding a job that matches their education. While some studies show a significant persistence in educational mismatch, there is also evidence of significant labour market integration. One explanation for this is imperfect information. The lack of information from the perspective of the employer and the potential employee creates frictions in the search-and-match context. This situation in which what the potential employees and the employers know about each other particularly applied to young workers at the start of their career and immigrants. For immigrants the initial search-and-match cost is relatively higher, because they have to get to know the new labour market structure. As they reside longer in the country they are then able to search for a better job match while employed and less and less educational mismatch is likely to be observed. (Piracha – Vadean 2012) This fact is consistent with search theory, which predicts that workers increasingly find better matches, and with the theory of career mobility, which state that workers who are over-educated in their first job have a higher probability of being promoted. (Leuven – Oosterbeek 2011)

Model 2: **Empirical model**

	Slovaks				EU				NON-EU			
	Men		Women		Men		Women		Men		Women	
	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio
Length of stay	-0,025***	0,975	-0,018***	0,983	-0,014***	0,986	-0,049***	0,952	-0,015***	0,985	-0,014***	0,987
Married	-0,201***	0,818	-0,308***	0,735	-0,261***	0,770	-0,087*	0,916	-0,012	0,988	0,127***	1,135
Employee	-0,115***	0,892	-0,539***	0,583	-0,208***	0,812	0,241***	1,273	-0,253***	0,777	-0,154***	0,857
Work outside Prague	-0,537***	0,585	0,133***	1,142	0,241***	1,272	0,056***	1,057	0,602***	1,825	0,021	1,021
Middle age (30-49)	-0,047*	0,954	-0,913***	0,401	-0,391***	0,677	0,550***	1,734	-0,348***	0,706	-0,401***	0,670
Elderly (50+)	0,339***	1,404	-0,553***	0,575	-0,329***	0,719	0,661***	1,937	-0,297***	0,743	-0,162***	0,850
Constant	0,069**	1,072	0,624***	1,866	-0,116***	0,891	-0,543***	0,581	-0,110***	0,895	0,611***	1,842
Pseudo R2 (McFadden)	0,030		0,050		0,015		0,054		0,021		0,007	

***p<0.001; **p<0.01; *p<0.05
Note: only immigrants with a full-time job and not in full-time education
Note: Reference categories are: marital status – unmarried; type of employment – entrepreneur; region of work – Prague; age group - youth (under the age of 29).
Source: CZ-LFS data 2011-2014

Slovak immigrants who are married have lower odds of being over-educated than those who are not married. This is also true for male immigrants from EU countries. The opposite applies to women from non-EU countries – those who are married have higher odds of being over-educated than those who are not. This can be explained by the traditional gender roles of the women's background cultures, where their choices may be restricted by men's labour market prospects. Women's employment may take a back seat to men's needs for jobs and consequently if women do work they often have no choice but to work in the services sector, regardless of their qualifications.

Employed immigrants generally have lower odds of being over-educated than those who conduct business. Only women from EU countries who are employed have higher odds of being over-educated than those who run a business.

Only Slovak male immigrants who work outside Prague have lower odds of being over-educated than those who work in the capital city. Slovak men are probably attracted to (available) matching jobs in regions close to the borders of Slovakia. In the other groups studied, those who work outside of Prague have higher odds of being over-educated than those who work in Prague. This is particularly evident among men from non-EU countries. Those working outside Prague have twice the odds of being over-educated than those working in Prague. The region of work is insignificant only in the case of women from non-EU countries, which may be because there are fewer job opportunities (generally) in other regions of the Czech Republic. This finding contradicts the conclusions of a UK study in which immigrant workers in London were more often found to be over-educated. (Campbell 2013)

Slovaks women and women from non-EU countries have similar patterns by age groups. Women in these two immigrant groups have lower odds of being over-educated when they are in middle age and older age groups than young women. Immigrants from EU countries show another pattern. Middle-aged and older men have lower odds of being over-educated than young men, while conversely older women have greater odds of being over-educated than young women.

Model 3 – Worker self-assessment

To compare subjective and empirical over-education we constructed two models on the same sample. The subjective model is based on worker self-assessment of over-education. The dependent variable is constructed from immigrants' responses to a question in the 2014 Czech Labour Force Survey's ad-hoc module: 'Considering your educational level, experience and skills, do you feel overqualified for your current main job?' The dependent variable is

coded as: 0 – don't feel overqualified; 1- feel overqualified. The empirical model is a simplified version of Model 2 based on the 2014 CZ-LFS data.

Model 3: **The subjective model compared to empirical over-education**

	Subjective over-education				Empirical over-education			
	Men		Women		Men		Women	
	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio	B	Odds Ratio
Length of stay	-0,025***	0,975	-0,040***	0,961	-0,015***	0,985	-0,033***	0,968
Married	-0,776***	0,460	-0,470***	0,625	-0,019	0,981	0,226***	1,254
Employee	0,250***	1,284	1,411***	4,102	-0,384***	0,681	0,209***	1,232
Work outside Prague	0,806***	2,238	0,901***	2,463	0,187***	1,205	0,070**	1,072
Middle age (30-49)	0,044	1,045	-0,061*	0,941	-0,057*	0,945	-0,377***	0,686
Elderly (50+)	0,726***	2,066	0,543***	1,722	0,276***	1,318	0,402***	1,494
EU	0,649***	1,914	1,495***	4,461	-0,737***	0,478	1,431***	4,182
Non-EU	0,399***	1,491	1,056***	2,875	0,209***	1,232	1,380***	3,977
Constant	-2,171***	0,114	-3,141***	0,043	-0,338***	0,713	-0,727***	0,483
Pseudo R2 (McFadden)	0,063		0,107		0,027		0,117	

***p<0.001; **p<0.01; *p<0.05
Note 1: only immigrants with a full-time job and not in full-time education
Note 2: Reference categories are: marital status – unmarried; type of employment – entrepreneur; region of work - work in Prague; age group - youth (under the age of 29), country of origin - Slovakia.
Source: CZ-LFS Ad-hoc module 2014

The subjective model shows that the odds of being subjectively overqualified in the population of immigrants in the CR differ for men and women. An OECD (2014) study shows that immigrant women often face the double disadvantage of being a woman and an immigrant. The double disadvantage is consistent with the theory put forth by Frank (1978) that explains the higher incidence of over-schooling amongst women on the basis of gender roles – when men are the prime income earners in a household and when where the household lives is determined by the man's labour market prospects, women's employment options are necessarily more limited.

The longer immigrants reside in the Czech Republic the odds of immigrants subjectively feeling overqualified decrease as do the odds of empirical over-education.

Married immigrants have lower odds of subjectively feeling overqualified than immigrants who are not married. It is interesting that subjectively women have lower odds of feeling overqualified, but objectively it is the other way

around. The explanation for this may be that married women are traditionally engaged in caring for children and men have higher work ambitions.

Employees have in general higher odds of being subjectively overqualified than entrepreneurs, and this is especially true of women, who are four times as likely to feel subjectively overqualified than women who run a business. The explanation for this may be the higher work satisfaction and greater skills utilisation that come from running one's own business as opposed to working for the profit of someone else.

Immigrants who work outside Prague have greater odds of subjectively feeling overqualified than those who work in Prague. This corresponds to the results of the previous empirical overqualification model.

While men's subjective overqualification rises with age, women of middle age have lower odds of feeling overqualified than young women and older women have higher odds of feeling overqualified than young women. It seems that only women between the ages of 30 and 49 are not undervalued in the Czech labour market. While older immigrants are probably more skilled and have more work experience than younger workers, those skills are probably less likely to be applicable in a foreign labour market. Thus differently skilled immigrant workers set out from a similar starting point in the foreign labour market, but older immigrants are additionally disadvantaged by age.

While men from EU countries have 1.9 times higher odds of subjectively feeling overqualified than Slovaks, empirically they are the very opposite. This corresponds to what we found in Model 1 that men from EU countries have greater odds of working in a high-skilled profession even than Czech men. EU men are probably most ambitious group, which could explain this discrepancy. Other immigrant groups have higher odds of subjectively feeling overqualified than Slovak immigrants.

The education variable was not included in the model. (Chiswick – Miller 2007)

Using the CZ-LFS Ad-hoc module in 2014 we were also able to include knowledge of the Czech language as a predictor in the subjective model. When this predictor is added, the coefficients of original variables remain almost unchanged, but the quality of the model is improved (Pseudo R2 increases on 0.091 and 0.135 for men, women resp.). Only men with intermediate knowledge of the Czech language have higher odds of being subjectively overqualified than men with basic knowledge of the Czech language. Other groups (men and women with intermediate and advanced knowledge) have lower odds of being overqualified than those with beginner knowledge. As the immigrants' knowledge of the host country's language improves they can more easily climb up the occupational ladder.

Conclusion and discussion

The Czech Republic has a relatively small share of immigrants in its labour force. This is mostly due to its historical development, as the former Czechoslovakia opened its borders to foreigners with the fall of communist regime in 1989. Before the Velvet Revolution natural migration was not permitted and the whole state was isolated from the Western block by the 'Iron Curtain'. Political factors thus have played a major role in shaping legal migration flows. In the 1960s and 1970s, under intergovernmental agreements, the arrival of workers from Poland, Vietnam, Cuba and Mongolia was allowed owing to a shortage of labour. A considerable number of Slovaks were already living in Bohemia and Moravia during the Protectorate in the Second World War, but after 1945 their migration came into importance. Slovak migration at that time was included in internal migration, until after the division of Czechoslovakia it became international migration. (Drbohlav et al. 2010)
Thus natural immigration is a relatively recent phenomenon that started in the 1990s in the Czech Republic. During the last twenty years, the number of immigrants has been growing, but the Czech Republic is still a country with a smaller immigrant population than most Western countries. The CR is a relatively small country and given its economic development and many other factors it's not the top target destination of economic immigrants. The majority of immigrants in the Czech labour force come from former communist countries, especially Ukraine, Slovakia and Vietnam, though for different reasons.

The largest group of immigrants are Ukrainians. To them, the CR is attractive for its relative proximity, economic development and language proximity. The large share of immigrants from Slovakia is due to the shared history of Czechs and Slovaks, who lived in one state between 1918 and 1993 (with the exception of the period 1939-1945). Though Czechs and Slovaks speak different languages, these languages are so similar that there is no language barrier between them. Slovaks also have convenient access to Czech tertiary education for free and often have family or social networks that make it easier for them to move to the CR. Citizens of Vietnam choose the Czech Republic for its economic development and also thanks to the ties between the CR and Vietnam that existed during the communist era, when, on the basis of an international agreement, Vietnamese nations were allowed to come to the CR to gain work experience for a specific period of time.

In comparison with the domestic population, immigrant workers have more favourable characteristics in terms of the share of employment of men, the share of tertiary educated and the share of people working in high-qualified professions. This is to some degree due to the fact that the immigrants who

come to the Czech Republic do so to work in large multinational companies, where the communication language is English. A common practice at these large companies is that managerial positions are usually occupied by experienced foreign workers. Another factor influencing the influx of tertiary educated immigrants is their inflow into the research and innovation centres of foreign companies.

Our study had three main research objectives. The first research objective was to investigate whether immigrants in the Czech Republic more often work in high-qualified professions compared to domestic workers. We found that not all immigrants are successful in finding a job that matches their qualifications. Immigrants are less successful than Czechs as the shares of both over-educated and under-educated immigrants are higher than in the case of Czechs. Model 1 showed that immigrants have generally lower odds of working in high-qualified jobs. Only men from EU countries have higher odds than Czech men of working in high-skilled professions. This group of immigrants are probably working mostly in international companies and thus in better jobs. Workers from Slovakia are only slightly disadvantaged in the Czech labour market and the most disadvantaged group are immigrants from non-EU countries. The most important predictor of working in high-skilled occupations for both genders is level of education.

The second objective was to investigate whether a number of theoretical assumptions affect the empirical incidence of over-education between groups of immigrant workers. Model 2 answers the question of which factors contribute to the over-education of immigrants. We found that with every additional year spent in the Czech Republic the odds of being over-educated decrease. Employed immigrants generally have lower odds of being over-educated than those who conduct business. The region of work also has an effect on over- education. Only Slovak male immigrants who work outside Prague have lower odds of being over-educated than those who work in the capital city. Gender also has a significant effect on over-education; immigrant women are less successful in finding jobs that match their educational level in the Czech labour market.

The third objective was to explore the factors behind the subjective perception of over-education. A comparison of subjective and empirical over-education showed that with more years spent in the Czech Republic the odds of subjectively feeling overqualified and empirical over-education both decrease. In comparison with Slovaks, immigrants from both EU and non-EU countries have higher odds of being over-educated. This can be explained by the cultural and language similarities of Slovaks and Czechs and also the relatively large share of Slovaks who complete their tertiary education in the Czech Republic. While men's subjective over-education rises with age, older women feel less

overqualified than young women. Knowledge of the Czech language generally increases the odds of working in matching occupations.

It is necessary to acknowledge that an important factor (in these findings) is the data used in this study. LFS data don't cover the population living in communal establishments, which may lead to an under-representation of less qualified immigrants that are less successful in the Czech labour market.

It is important that more studies be made of the situation of immigrants, especially in the current European migration crisis. The skills of immigrants that are not used represent wasted human capital and may also have a negative impact on integration and social cohesion. From a methodological perspective, it is necessary to cover not only immigrants living in households but also those who live in communal establishments. It is an important task for the policy-makers to find a way in which to tap into the full skills potential of immigrants.

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Attachments

Attachment 1: List of variables for Model 1

Table: **Descriptive variables for Model 1 – men**

		Czechs	Slovaks	EU countries	Non-EU countries
Skill level of occupation	High-skilled occupation (ISCO 1-3)	35,9%	37,1%	55,8%	38,7%
	Low-skilled and unskilled occupation (ISCO 4-9)	64,1%	62,9%	44,2%	61,3%
Education	Compulsory	3,1%	6,6%	6,0%	12,3%
	Secondary	44,0%	39,3%	23,7%	23,8%
	Upper secondary	33,3%	28,2%	26,0%	33,7%
	Tertiary	19,7%	25,9%	44,3%	30,3%
Age group	Youth (under the age of 29)	17,5%	16,2%	11,5%	13,5%
	Middle age (30-49)	55,7%	53,4%	63,4%	70,0%
	Elderly (50+)	26,8%	30,4%	25,1%	16,4%
Marital status	Married	58,4%	55,2%	63,6%	69,2%
	Not married	41,6%	44,8%	36,4%	30,8%
Working hours	40 h/week and less	72,2%	75,1%	65,5%	50,0%
	more than 40h/week	27,8%	24,9%	34,5%	50,0%

Table: **Descriptive variables for Model 1 – women**

		Czechs	Slovaks	EU countries	Non-EU countries
Skill level of occupation	High-skilled occupation (ISCO 1-3)	40,0%	36,2%	34,3%	22,2%
	Low-skilled and unskilled occupation (ISCO 4-9)	60,0%	63,8%	65,7%	77,8%
Education	Compulsory	4,9%	9,0%	11,5%	14,3%
	Secondary	28,8%	25,3%	22,6%	22,6%
	Upper secondary	43,8%	39,0%	46,2%	34,7%
	Tertiary	22,4%	26,7%	19,8%	28,4%
Age group	Youth (under the age of 29)	15,3%	16,5%	8,4%	17,5%
	Middle age (30-49)	56,8%	53,0%	51,9%	66,1%
	Elderly (50+)	27,9%	30,5%	39,7%	16,5%
Marital status	Married	59,1%	50,1%	56,9%	58,0%
	Not married	40,9%	49,9%	43,1%	42,0%
Working hours	40 h/week and less	88,1%	85,1%	78,7%	74,5%
	more than 40h/week	11,9%	14,9%	21,3%	25,5%

Attachment 2: List of variables for Model 2

Table: **Descriptive variables for Model 2 – men**

		Slovaks	EU countries	Non-EU countries
Educational (mis)match (realized matches)	Matched	72,9%	68,8%	59,7%
	Over-educated	27,1%	31,2%	40,3%
Average length of stay in the CR (years)		21,2	13,7	11,3
Age group	Youth (under the age of 29)	16,2%	11,6%	14,2%
	Middle age (30-49)	53,4%	63,5%	69,7%
	Elderly (50+)	30,4%	24,9%	16,1%
Work as an	Entrepreneurs	15,8%	28,0%	50,6%
	Employees	84,2%	72,0%	49,4%
Region of employment	Work in Prague	16,9%	31,7%	45,4%
	Work outside Prague	83,1%	68,3%	54,6%
Marital status	Married	55,2%	62,8%	68,2%
	Not married	44,8%	37,2%	31,8%

Table: **Descriptive variables for Model 2 – women**

		Slovaks	EU countries	Non-EU countries
Educational (mis)match (realized matches)	Matched	70,3%	66,9%	46,9%
	Over-educated	29,7%	33,1%	53,1%
Average length of stay in the CR (years)		21,1	20,2	12,1
Age group	Youth (under the age of 29)	16,5%	8,4%	16,8%
	Middle age (30-49)	53,0%	51,9%	67,0%
	Elderly (50+)	30,5%	39,7%	16,3%
Work as an	Entrepreneurs	10,2%	23,3%	21,6%
	Employees	89,8%	76,7%	78,4%
Region of employment	Work in Prague	19,5%	32,1%	41,7%
	Work outside Prague	80,5%	67,9%	58,3%
Marital status	Married	50,1%	56,9%	58,2%
	Not married	49,9%	43,1%	41,8%

Attachment 3: List of variables for Model 3

		Immigrants
Educational (mis)match (subjective)	Matched	83,6%
	Overqualified	16,4%
Educational (mis)match (realized matches)	Matched	63,2%
	Over-educated	36,8%
Average length of stay in the CR (years)		17,6
Age group	Youth (under the age of 29)	13,2%
	Middle age (30-49)	60,2%
	Elderly (50+)	26,6%
Work as an	Entrepreneurs	27,7%
	Employees	72,3%
Region of employment	Work in Prague	63,9%
	Work outside Prague	36,1%
Mastery in Czech language	Beginner	5,0%
	Intermediate	53,5%
	Advanced/mother tongue	40,8%
Marital status	Married	58,4%
	Not married	41,6%
Nationality	Slovaks	44,4%
	EU countries	15,0%
	Non-EU countries	40,6%