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Gender, brain waste and job-education mismatch among migrant workers in Switzerland

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Contents

Abstract

This study examines the incidence and determinants of over- and underqualification among documented migrant workers in the Swiss labour market using cross-matched data from two sources of comprehensive information. At the same time, our statistical analysis aims at investigating the existence of gender differences in terms of brain waste. The main findings show firstly that the incidence of job-education mismatch is higher among first-generation immigrants. Secondly, the duration of residence in the host country plays an important role in the probability of being over- or underqualified. Thirdly, our results support the relatively disadvantaged situation of immigrant women with young children in finding a job commensurate with their education. The conclusion gives some policy recommendations on how to make the best possible use of foreign qualifications of documented migrant workers and avoid any form of deskilling in the host labour market.

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1. Introduction

In Switzerland, the last decades have been characterized by the growing importance of science- and technology-related activities (Pastor, 2002) while selected professional fields are experiencing a shortage of qualified labour (Huth, 2004). Besides, participation in tertiary education has risen by almost 20% between 1990 and 2000, the increase being higher for foreign graduates (about 25%).[1] Even the nature of migration flows, which was mainly based on a low-educated labour force, has evolved in favour of highly qualified labour (Pecoraro, 2005).

In this context, imbalances between the demand and supply for qualified workers may be problematic, in particular if the demand turns out to be insufficient or unresponsive to changes in the supply. This issue has encouraged researchers to investigate why the matching process between vacancies and job-seekers may occur without any preliminary correspondence between the levels of education demanded and supplied, leading *in fine* to cases of over- or under qualification (i.e. job-education mismatch).[2] Workers are defined as overqualified when their attained level of education exceeds the required level of education to perform a job; in the case of immigrants, this is often linked to the phenomenon of *brain waste*, as their educational qualifications are being underutilized in the host labour market.[3] By analogy, under qualified workers have less education than it is required for their job; this may imply that they have high values of other unobserved aspects of human capital (e.g. *innate* ability and motivation) and, in a sense, are more able compared to matched workers from a same qualification category.

Recently, McGuinness (2006) provides a complete review of the empirical literature on overqualification. He emphasizes that overqualification can be a costly phenomenon affecting not only the economy as a whole but also firms and individuals. In macroeconomic terms, overqualification reduces a nation's welfare by wasting tax revenues on an educational system that produces graduates not utilizing their qualification. For firms and individuals, overqualification is associated with lower levels of productivity and earnings. Based on evidence from existing studies, the incidence of overqualification in developed countries is ranging from 7% to 57% (McGuinness, 2006). Moreover, it is generally admitted that the return to overqualification (resp. underqualification) is positive (resp. negative) but lower (in absolute value) than the return to required education (Hartog, 2000; McGuinness, 2006).

Meanwhile, recent studies indicates that the incidence of overqualification is important among some foreign/immigrant groups. Indeed, such evidence has been documented by Battu and Sloane (2004) for Britain, Dumont and Monso (2007) for the OECD countries, Lindley (2009) for the United Kingdom, Nielsen (2009) for Denmark and Chiswick and Miller (2008, 2009) for the United States. According to these studies, the share of overqualified immigrants is ranging from 21% (for male nationals from Pakistan and Bangladesh in the United Kingdom) to 51% (for male nationals from the former Soviet Union in the United States). Qualitative studies have also shown that a significant share of immigrant women in Switzerland occupy positions for which they are overqualified (Riaño and Baghdadi, 2007; Chicha and Deraedt, 2009). After controlling for

[1] A wide range of statistics covering education in Switzerland are available at the SFSO website (http://www.bfs.admin.ch/bfs/portal/en/index/themen/15.html).

[2] In the literature, there exist different synonymous terms such as over/undereducation, over/underschooling or surplus/deficit schooling.

[3] In general, this phenomenon rather reflects the underutilization of immigrant skills, which is also referred to as a process of *deskilling*. As pointed out by Mattoo et al. (2008), a second aspect of brain waste pertains to the global misallocation of human capital, i.e. whether migrants' skills would have been better used in their home countries.

various individual characteristics, it appears that human capital acquired abroad increases the risk of overqualification in the host country, meaning that it is imperfectly transferable to the labour market of the host country (see also Chiswick, 1978; Friedberg, 2000). Concerning the earning consequences of overqualification, the available evidence is mixed. While in some European countries overqualification

http://www.youtube.com/watch?v=r9RPJDvcdEw

is associated with a larger wage penalty for immigrants (in particular those with foreign-based qualifications), Chiswick and Miller (2008) show that the effect of adequate education on earnings is similar between U.S. natives and immigrants.

While the incidence of job-education mismatch among migrant workers is neglected in Swiss research, this study aims to systematically take them into account through original data resulting from a probabilistic match between two comprehensive sources. Including various socio-demo-economic characteristics, these data enable us to identify factors involved in the likelihood of being over- or under qualified. Given their comprehensive aspect, they offer the possibility to analyze the immigrant population according to several aspects, like the migratory status, the duration of residence in the host country or the region of origin. This study also contributes to the existing literature by examining gender differences in terms of brain waste. The next section briefly describes the data used throughout this paper. The first part of Section 3 is devoted to the measurement criteria adopted for defining job-education mismatch, while the second part presents the regression method used in the analysis. Section 4 reports the incidence of job-education mismatch and the estimation results. Section 5 recapitulates the principal results and discusses recommendations that can contribute to minimizing the incidence of overqualification among migrant workers.

2. Data description

This study is based on cross-matched data from two sources of comprehensive information: the 1990 and 2000 Swiss censuses and the Central Register of Foreigners (RCE).[4] Personal identifying information on permanent foreign residents from both sources was linked using probabilistic linkage techniques and identification was successful in at least 80% of the cases.[5] The dataset generated by this procedure constitutes a representative sample of the permanent resident population in 1990 and 2000, including Swiss nationals and foreigners with a B or C permit.[6] It explicitly acknowledges the heterogeneity within the migrant community in Switzerland, as it includes a standard set of variables capturing characteristics from the RCE (birthplace, date of immigration and emigration) and the census (e.g. highest education level achieved, local language proficiency, type of occupation, marital status). For the empirical analysis, we select the occupied labour force belonging to the working age population above 25 years (25-65 for men, 25-62 for women);[7] we also remove the self-employed, people in the armed forces and those currently in education.[8] Taken together, the final sample contains 2'206'059 and 1'884'004 individuals, respectively, for 1990 and 2000.

The foreign population is divided in two groups according to the migratory status. Foreigners who arrived in Switzerland from the age of 15 are defined as the first-generation immigrants (who firstly came for working). Those arriving before reaching the age of 15 are then regarded as the children of first-generation immigrants, since they inevitably had access to compulsory school in the host country.[9] Table 8 in Appendix presents the distribution of the permanent resident population across different groups.

[4]The RCE is an administrative source of information about permanent foreign residents in Switzerland; it is used for compiling official statistics about the foreign population. By definition, undocumented migrants do not appear in the RCE, where all the foreigners with a valid residence permit are registered.

[5]The software LinkPro (Wajda, 1992) has been used for the matching procedure. Linkage variables were year of census, nationality of origin, sex, date of birth (day, month and year), municipality of residence, residence in Switzerland for less than five years, civil status, residence permit and birthplace. Records were linked if there was complete agreement on year of census, nationality of origin, sex and date of birth and if probabilistic weight calculated from the other linkage variables was positive.

[6]The B permit is an annual residence permit that has to be renewed every year. The C permit is a permanent residence permit that has to be checked every five years; it enables to do many things not possible with the B permit (such as buying real estate without restrictions, moving from one canton to another, becoming self-employed, etc.). The C permit can be obtained after 5 or 10 years of residence with the B permit. More details on the permit types can be found at the Federal Office of Migration website (http://www.bfm.admin.ch/bfm/en/home/themen/aufenthalt.html).

[7]The retirement age for women remained at 62 years until 2002 and we have therefore chosen to rely on this threshold age.

[8]In the empirical analysis, we neglect the effect of sample selection.

[9]The age at immigration actually allows us to distinguish the children of first-generation immigrants having partially (arrived after the age of 5) or fully (arrived before or born in Switzerland) attended compulsory school in Switzerland; the latter are referred to as *second generation* and the former are considered as belonging to the *intermediate generation*.

3. Empirical methods

3.1 Measuring job-education mismatch

In the literature, three methods are generally used for measuring required education (for a complete overview, see Hartog, 2000). The first measure is obtained from the **job analysis** method; according to this *objective* method, the level of education required to perform a particular job is obtained from a systematic job evaluation. It is important to note that this information is actually unavailable for Switzerland.[10] Secondly, some surveys include the **worker's self-assessment** of educational requirement; this *subjective* method consists in asking workers directly how much education is required to *get* or *do* their job. Finally, required education can be defined by the **realised matches** method. There exist two main measures derived from this *objective* and *statistical* method. First, the required education is defined as a band around the mean level of education within each occupation (Verdugo and Verdugo, 1989). Workers are then overqualified (resp. under qualified) if their actual education expressed in years diverges by more than one standard deviation above (resp. below) the mean value for a given occupation. The required education can also be established from the modal rather than the mean level of education (Kiker et al., 1997). Accordingly, workers are overqualified (resp. under qualified) if their educational attainment falls above (resp. below) the modal value for a specific occupation. The modal-based measure is preferred since it is less sensitive to technological and organizational change over time, and it also enables to avoid the assumption of symmetry inherent to the standard deviation method.

In the absence of any subjective measure of educational requirements, we derive required education from the modal level of education in each occupation, separately by census year, using information on *all* workers.[11] The highest level of education achieved consists of seven levels classified in an increasing hierarchical order (more details in Appendix).[12] Moreover, we rely on the ISCO classification disaggregated on a 4-digit level with at least 10 observations in a year; this amounts to deal with almost 500 occupations.[13]

The statistical measure of required education, on which most studies rely for investigating job-education mismatch amongst migrant workers (e.g. Battu and Sloane,

[10]Despite this established fact, Pecoraro (2005) and Dumont and Monso (2007) used for Switzerland a simplified version of this measurement method based on the correspondence between the variables ISCED (International Standard Classification of Education) and ISCO (International Standard Classification of Occupations). The simplified nature of this approach stems first from the fact that the aforementioned correspondence is not country- and time-specific; the patterns of correspondence should actually differ by country and over time. Secondly, categories of occupation are aggregated in such a way that all jobs in the same group have identical educational requirements; in reality, educational requirement for a given group of occupations may vary from one job to another. As noted by Dumont and Monso (2007), defining job-education mismatch from a simplified correspondence between education and job classification runs the risk of multiples biases and is then not satisfactory.

[11]As noted by Chiswick and Miller (2008), the choice of the population for defining the modal level of education is not a major issue, since the statistical measure is heavily influenced by the occupational distribution of Swiss nationals that are predominantly present in nearly all occupations.

[12]All results reported below have also been performed using three levels of education as in Dumont and Monso (2007). This procedure generates low shares of overqualified workers in each of the sub-populations, being comparable to those derived by Dumont and Monso (2007) for natives and immigrants in Switzerland. Nevertheless, the main results of the multivariate analysis are not sensitive to a change in the aggregation level of education.

[13]Further information on the ISCO classification are available at the ILO website (http://www.ilo.org/public/english/bureau/stat/isco/index.htm).

2004; Nielsen, 2009; Lindley, 2009; Chiswick and Miller, 2008, 2009), has been criticized for various reasons (for a discussion, see Hartog, 2000; Borghans and Grip, 2000; Chevalier, 2003; Verhaest and Omey, 2006). A serious drawback stems from the assumption that all individuals with a given level of education are homogeneous in their skills endowment. Indeed, recent studies (e.g. Chevalier, 2003; Green and Zhu, 2010; Pecoraro, 2009) show that this hypothesis may substantially bias both the incidence and labour market effects of overqualification. As pointed out by Green and McIntosh (2007), individuals with the same level of education have different actual skill levels, so that they can be overqualified in terms of education, while their skills are actually appropriate for the jobs that they do. Because of a lack of information regarding workers' skill endowments, our dataset does not allow to verify if the statistical mismatch is *genuine* or *apparent*.

3.2 Explaining job-education mismatch

Before presenting our modelling method, we first formulate some expectations about potential factors that may influence the likelihood for an immigrant to be over- or under qualified.

Gaining experience in the host country should improve language skills and the knowledge about the host country labour market, which allow migrant workers to build up a network and thus optimize the job search process. As noted by Nielsen (2009), the younger the age at immigration is, the more efficient the immigrant's adjustment is to a new environment. The fact that educational qualifications are acquired abroad should increase the risk of being overqualified if these qualifications are not as productive in the host country as they are in the origin country (due to the poor quality of acquired education or non-recognition of the foreign credentials). This disadvantage reflects the less-than-perfect international transferability of immigrants' qualifications (Chiswick, 1978; Friedberg, 2000; de Coulon et al., 2003; Battu and Sloane, 2004; Chiswick and Miller, 2008). Unfortunately, the information concerning the place where education was acquired is not available in the data at hand.

Concerning the likelihood for an immigrant woman relative to an immigrant man to be overqualified, the existence of labour market rigidities should increase gender differences in terms of brain waste. For instance, a situation where the family's choice location only depends on the husband's job search strategy may limit the wife's opportunities in smaller labour markets given that her job search process is constrained by her husband's prior decisions. Accordingly, married women should experience higher risks of overqualification (Frank, 1978). Another form of labour market rigidity that may hinder women with respect to the full utilization of their educational qualifications is related to the unfavourable institutional arrangements concerning child care and maternity leave (Atukeren and Wirz, 2005). Finally, many researchers argued that immigrants' disadvantage in finding a job commensurate with their formal qualifications results from labour market discrimination (Battu and Sloane, 2004; Dumont and Monso, 2007); this is particularly the case with respect to immigrant women (Chicha and Deraedt, 2009). In Battu and Sloane's empirical model, for instance, controlling for foreign-based qualifications increases the likelihood of overqualification among ethnic minorities in Britain; however, only controlling for this effect does not mean that discrimination leads to situations of overqualification among those latter. In order to better understand the logic of this assertion, it is necessary to refer to the literature on wage differentials by race or gender (for a discussion, see chapter 10 in Borjas, 2004). This differential can be decomposed into two components. The first component is explained by differences in individual characteristics; the second component, however, can not be explained by these characteristics. Two categories of factors are thus likely to form the unexplained component. First, it is possible that two groups of individuals (e.g. men and women) differ

systematically with regard to certain aspects of human capital that are difficult to measure with available indicators (e.g. innate ability and motivation). Secondly, discrimination may cause a difference in the wage return for the same level of human capital. It is then difficult to quantify the relative importance of each of these two categories of factors, in particular the extent of discrimination. Moreover, a growing number of studies have shown that the wage effects associated with job-education mismatch largely disappears after controlling for unobserved ability (Bauer, 2002; Chevalier, 2003; Frenette, 2004), implying that overqualified (resp. underqualified) workers are in reality less (resp. more) able than correctly matched workers. Hereafter, we can not test for discrimination given that our dataset does not allow us to control for unobserved heterogeneity across individuals.

We follow Chiswick and Miller (2008) by using a multinomial logit regression model in order to identify the determinants of job-education mismatch. It enables to express the probability of being over- or under qualified according to different individual characteristics, the alternative being adequately educated. We assume that job-education mismatch for individual i is determined by the following model: $M_i^* = X_i\beta + e_i$, with $i = 1,2,...,N$.[14] Given that the latent model is not observed, we define the polytomic variable M_i as the realization of three possible states:

$$M_i = j = \begin{cases} 1 \text{ if } M_i^* < 0 \text{ (underqualification)} \\ 2 \text{ if } M_i^* = 0 \text{ (adequate education)} \\ 3 \text{ in } M_i^* > 0 \text{ (overqualification)} \end{cases}$$

The probabilities for individual i to be in situation j are:

$$\mathbb{P}(M_i = j \mid X_i) = \frac{\exp(X_i\beta_j)}{\sum_{h=1,2,3} \exp(X_i\beta_h)}$$

The vector X_i includes a set of controls such as individual resources (age, age squared, years since migration, years since migration squared, main language spoken), household situation (marital status, number of children below 6 in the household), area of residence, region of residence, census year, residence permit and region of origin (with Italians being the reference group). Separate models are estimated for men and women, belonging to the first-generation immigrants. As pointed out by Nielsen (2009), the relationship being estimated is not necessarily causal but serves to identify important correlations in the data.

[14]The latent variable M_i^* depends linearly on the vector of personal characteristics X_i with K components and the error term e_i. The vector β contains K unknown parameters to estimate. The disturbance term e_i that represents the unobservable component of job-education mismatch is by assumption normally distributed and independent of X_i

4. Results

4.1 Descriptive statistics

Before discussing the tables reported in this Sub-section, we briefly comment the general pattern of Tables 9 to 14 in Appendix. These tables show, for 1990 and 2000, the distribution of educational attainment across gender by nationality (Table 9) generation (Table 10) and other characteristics of immigrants (Tables 11 to 14). For nearly all groups under consideration, the share of tertiary-level educated workers augmented during the 1990s. For the first-generation immigrant men and women, it increased respectively by three quarters (30% in 2000 as opposed to 17% ten years ago) and by almost 200% (26% in 2000 as opposed to 10% ten years ago). In 1990, most first-generation immigrant men and women from North America and Oceania completed a tertiary-level education, whereas less than half of those from other origins achieved such a qualification (the proportions ranged from 2% to 46%). During this year, we also note that a majority of first-generation immigrant men from Other EU15/EFTA countries or Eastern Europe (labelled Other Europe) hold a tertiary-level education, while women from the same origin have mostly an upper secondary level education. In 2000, however, first-generation immigrants of many origins show higher shares of third-level educated workers than ten years before, whatever the gender. Most of these observations are in line with Pecoraro and Fibbi (2010). In parallel, it is also interesting to notice that at least 45% and 35% of first-generation immigrants only completed the compulsory school in 1990 and 2000, respectively. Moreover, for all sexes, comparable proportions are found among earlier cohorts of immigrants while they reach more than 50% among those coming from Italy, Spain, Portugal, Ex-Yugoslavia (only in 1990) and Turkey. This *bipolarity* in terms of educational attainment certainly results from the fact that migration policies promoted immigration of low-skilled labour (till the end of *The Glorious Thirty*) and subsequently immigration of high-skilled labour (since the implementation of the *three/two circles model*[15]) coupled with immigration for other reasons than work (e.g. marriage migration or family reunification).

Table 1 represents the shares of over- and under qualified among permanent resident workers, by census year and gender.[16] The upper part of this table shows the proportions derived for Swiss nationals. The majority of Swiss male (resp. female) workers are adequately educated and their share reaches 62% (resp. 65%) in 1990, decreasing to 58% (resp. 61%) ten years later. Among Swiss men, at least 1/4 is overqualified and this proportion has remained stable since 1990. Swiss women exhibit a lower incidence of overqualification, which could be related to the fact that they are generally less educated than their male counterparts (see Table 9 in Appendix); attaining 18% in 1990, this share only increased from 3 percentage points in ten years. While 18% of Swiss women remain

[15]During the 1990s, the Swiss government introduced a range of restrictive policies with respect to the admission of immigrants from outside the EU/EFTA area, which was termed the *three circles model* in 1991 and then reformulated as the *two circles model* in 1998. According to these policies, which anticipate on free mobility with the EU countries, Swiss employers are advised to fill their needs with migrants from the latter countries; moreover, they can prospect worldwide for skilled workers. However, these hiring strategies are conceivable only if any Swiss worker cannot be recruited to fill the vacant job (with some exceptions regarding intra-firm transfer and family regrouping). Note that the priority given to Swiss workers does not prevail anymore towards citizens of the EU-15/EFTA since 1st June 2004.

[16]Note that the shares exposed in Tables 1 and 2 are significantly higher than those computed by Dumont and Monso (2007) given that we consider more levels of education than they do. But, as mentioned in footnote 12, the main results of the multivariate analysis do not change depending on whether we use seven or three levels of education for the calculation of the mode index.

under qualified during the period under observation, this situation affects 10% and 14% of Swiss men in 1990 and 2000 respectively.

Note that the proportions derived for Swiss nationals in 2000 are very similar to those obtained by Pecoraro (2009), who used the 1999 wave of the Swiss Household Panel and also relied on the mode index. Incorporating both the modal measure and the worker's self-assessment of required skills into an alternative measure of job-education mismatch, Pecoraro (2009) shows however that the statistical approach clearly overestimates the incidence of mismatch: among overqualified workers, for example, only 30% are in a situation of *genuine* overqualification. Accordingly, it is essential to interpret the descriptive results cautiously.

Among foreign nationals, the bulk of workers are correctly matched in 1990 (shares ranging from 54% to 61%). Ten years later, however, the contrary is true: more than 50% are mismatched in terms of educational requirements. If we focus our attention on the extent of overqualification in 1990, we notice that foreign workers present lower proportions compared to their Swiss counterparts (23% versus 28% for men; 17% versus 18% for women). In 2000, this trend is reversed: foreigners are more subject to situations of overqualification, the difference being the highest among women (31% for foreign workers versus 21% for Swiss workers). These figures support the idea according to which foreign workers in Switzerland became more and more educated during the 1990s (see Table 9 in Appendix), while the labour market experienced a serious economic downturn. Indeed, firms may respond to negative demand shocks by assigning workers to tasks that require less skill than the tasks they normally carry out (Devereux, 2000). Alternatively, the rise in the shares of overqualified foreigners could be a consequence of European Union enlargement reducing the average ability level of more recent immigration cohorts (Lindley, 2009). On the other hand, it is worth noting that underqualification is more prevalent among foreigners, whatever the year considered; in the case of men, the proportions of under qualified workers are at least two times higher for foreign nationals than for Swiss nationals (23% versus 10% in 1990; 31% versus 14% in 2000).

Table 1: Incidence of job-education mismatch by nationality (column percentage), permanent resident population

	1990		2000	
	Men	Women	Men	Women
Swiss nationals				
Adequately matched	62.2	64.5	57.7	61.3
Overqualified	28.3	18.0	28.5	21.0
Underqualified	9.5	17.5	13.7	17.8
Foreign nationals				
Adequately matched	53.7	61.4	38.9	44.3
Overqualified	23.4	16.5	30.5	30.5
Under qualified	22.9	22.1	30.7	25.3

Source : 1990 & 2000 Swiss censuses, Central register of foreigners (RCE)

Note : Swiss nationals also include naturalized foreigners.

Concerning differences by gender among foreign nationals, the jobs occupied by women appear to be in general less mismatched with their educational attainment in comparison with those occupied by men. Indeed, the proportions of foreign workers whose education is adequate to perform their job are higher among women than among men, for all years under consideration (61% versus 54% in 1990; 44% versus 39% in 2000). Moreover, the share of overqualified foreigners in 2000 is similar for both sexes, while ten

years earlier the incidence of overqualification was greater for men than for women (difference of 7 percentage points). The reverse applies to under qualified male and female foreigners: their shares are almost equal in 1990, whereas they clearly differ in 2000, the men being more prone to work in a job for which they are under qualified than women.

Table 2 reproduces the same information displayed in Table 1, but only for foreign permanent workers subdivided by generation. At first sight, it appears that foreigners from the second and intermediate generations are distributed across matching categories in a similar way as shown in Table 1 for Swiss nationals. So, they are predominantly well matched for all years under examination.[17] It is important to note that the shares of overqualified foreigners from the aforementioned generations remained almost unchanged between 1990 and 2000, whereas their educational attainment has improved since 1990 (see Table 10 in Appendix). Moreover, the incidence of underqualification among them is neither higher than it is for the first-generation immigrants nor lower than it is for Swiss nationals. Among the same group of foreigners, the shares of overqualified (resp. under qualified) workers are smaller (resp. higher) for women; this pattern is actually consistent with the fact that foreign women (whatever the generation) are underrepresented at the tertiary level than their male counterparts (see Table 10 in Appendix).

Most observations made about permanent foreign workers (cf.Table 1) can be applied in the context of first-generation immigrants, since the latter constitute the bulk of the foreign population. Nevertheless, it is worth outlining the main trends. First, the shares of migrant workers being adequately educated have fallen by about 20 percentage points since 1990. Secondly, the proportions of overqualified workers rose over the same period, with a higher increase among women (i.e. more than doubling). This pattern is in line with significant improvements in educational attainment among new immigrants to Switzerland (see Tables 13 and 14 in Appendix). Thirdly, while a low share of first-generation immigrant women are overqualified in 1990, this share exceeds all other comparable shares ten years later.

Table 2: Incidence of job-education mismatch by generation (column percentage), permanent foreign resident population

	1990		2000	
Generation	Men	Women	Men	Women
First				
Adequately matched	52.7	60.9	33.8	39.7
Overqualified	23.3	16.4	32.0	33.5
Underqualified	24.1	22.7	34.2	26.7
Intermediate and Second				
Adequately matched	63.4	65.7	58.8	62.1
Overqualified	24.5	17.2	24.3	18.5
Underqualified	12.1	17.1	17.0	19.4

Source : 1990 & 2000 Swiss censuses, Central register of foreigners (RCE)

Tables 3 and 4 show the distribution of first-generation immigrants across matching categories by census year and gender, according to some individual characteristics. First of all, it appears that job-education mismatch strongly varies according to the duration of residence (also capturing the cohort of arrival) in the host country. The most recent

[17]This is in particular the case for those from the second generation who completed their entire education in the host country (shares ranging from 60% to 68%).

migrants (living in Switzerland for less than five years) have the highest shares of overqualification (whatever the gender). With the improvement in educational attainment during the 1990s, the proportion of overqualified men (resp. women) among those arrived recently rose from 29% (resp. 21%) in 1990 to 53% (resp. 49%) in 2000. As these migrants are beginning a new career in Switzerland, it is likely that they still do not know the local language nor the functioning of the Swiss labour market. Indeed, the incidence of overqualification is declining with time spent in the host country or, in other words, among earlier cohorts of migrants. The same reasoning applies to the proportion of workers whose education is adequate for their job: in 2000, for example, this proportion amounts to less than 35% among the recent migrants and it increases up to more than 40% after 30 years of residence in Switzerland. Furthermore, there is among men an inverted U-shaped relationship between underqualification and years since migration in Switzerland; for women, however, this relationship is simply positive (the proportion of under qualified women increasing at a decreasing rate in 1990).

Strangely, the proportion of those being adequately educated among migrant women is slightly higher if the latter do not speak the local language as the main language, whatever the year under consideration. For men, such a spurious association is, however, not observed: 37% are correctly educated if the main language spoken is local (versus 32% if the main language spoken is foreign). Besides, the shares of overqualified workers are larger among first-generation immigrants when they mainly speak the local language; as a matter of fact, this reflects the positive correlation between the local language proficiency and the level of education (see Tables 11 to 14 in Appendix). Therefore, it is not surprising that the first-generation immigrants whose main language spoken is their native language are more likely to be under qualified.

The residence permit is another way to capture the duration of residence in Switzerland. Indeed, a foreigner can obtain a C permit after 5 or 10 years of residence with a B permit, meaning that the bulk of migrants with the latter permit are recently arrived in Switzerland. Accordingly, we find the highest proportions of correctly matched workers among the holders of a C permit for all sexes and years. In general, recently arrived migrants (with a B permit) are more educated than those belonging to earlier cohorts (with a C permit) that are generally low-educated (cf. Tables 11 to 14 in Appendix). Therefore, holders of a B permit are more likely to be overqualified while holders of a C permit present high shares of under qualified workers. This pattern is even more pronounced in 2000, given that the modal level of education among B permit holders is a university degree. Most observations previously made about gender differences are still valid, irrespective of the type of residence permit held.

The region of origin is another factor that has an important role in determining the type of job-education match. Thus, the first-generation immigrants coming from regions that were providing mainly low-educated labour (e.g. Italy, Spain, Portugal, Ex-Yugoslavia or Turkey) end up in jobs requiring more education than their attained level. The first-generation immigrants from Germany, France and other countries of the European Union (EU15/EFTA), that are generally more educated, expose high proportions of overqualified workers. This logic also applies to other nationals from outside the EU15/EFTA countries, since many of them are essentially highly educated (see Tables 11 to 14 in Appendix). Interestingly, the extent of overqualification is predominant among first-generation immigrants from developed countries (e.g. Other UE15/EFTA, North America, Oceania/Others) and especially among those from Eastern Europe.

Table 3: Incidence of job-education mismatch by individual characteristics (row percentage), first-generation immigrants with a B or C permit in 1990

	Men			Women		
	UQ	AM	OQ	UQ	AM	OQ
Years since migration						
0-4	22.9	48.6	28.6	18.4	60.7	20.8
5-9	24.7	50.5	24.8	22.0	59.3	18.7
10-14	24.1	51.3	24.6	23.3	59.9	16.7
15-19	26.3	54.1	19.6	24.6	61.9	13.5
20-24	24.2	55.6	20.2	24.4	61.9	13.7
25-29	25.1	57.2	17.7	25.5	62.1	12.4
30 +	20.5	60.0	19.5	25.6	61.4	13.1
Main language spoken						
Foreign	27.4	52.8	19.8	24.2	61.9	13.9
Local	15.9	52.4	31.7	18.7	58.2	23.2
Residence permit						
C permit	25.2	54.4	20.5	24.1	61.4	14.5
B permit	21.4	48.5	30.1	17.9	59.2	23.0
Region of origin						
Germany	6.0	54.2	39.9	10.9	60.3	28.8
France	12.6	48.2	39.3	18.9	50.5	30.6
Italy	30.7	55.3	14.0	26.3	65.4	8.3
Austria	7.2	58.7	34.1	17.6	57.3	25.1
Spain	33.7	55.0	11.3	24.7	66.9	8.4
Portugal	38.5	51.9	9.6	28.8	63.6	7.6
Other EU15/EFTA	11.6	38.2	50.3	15.6	52.5	31.8
Ex-Yugoslavia	20.7	57.6	21.7	21.9	61.0	17.2
Turkey	27.5	54.5	18.0	29.3	60.9	9.8
Other Europe	7.4	36.4	56.2	8.6	33.4	58.1
North Africa	16.8	41.3	41.9	23.6	50.0	26.4
Sub-Saharan Africa	16.7	38.7	44.6	22.9	48.6	28.5
North America	9.0	29.7	61.3	8.3	36.6	55.1
Latin America	19.3	39.8	41.0	21.5	48.2	30.3
Asia/Ex-USSR	20.6	39.8	39.6	23.5	50.8	25.7
Oceania/Others	9.2	39.6	51.2	9.2	50.5	40.4

Source : 1990 Swiss census, Central register of foreigners (RCE)

Note : UQ = under qualified; AM = adequately matched; OQ = overqualified.

Table 4: Incidence of job-education mismatch by individual characteristics (row percentage), first-generation immigrants with a B or C permit in 2000

	Men			Women		
	UQ	AM	OQ	UQ	AM	OQ
Years since migration						
0-4	17.9	29.3	52.8	15.2	35.4	49.4
5-9	33.7	32.6	33.7	23.6	40.5	35.9
10-14	39.3	32.4	28.4	28.9	39.6	31.5
15-19	41.1	33.2	25.7	31.9	40.1	28.0
20-24	40.6	35.7	23.7	34.2	40.3	25.5
25-29	44.6	36.9	18.5	38.8	42.0	19.3
30 +	39.6	43.3	17.1	39.3	44.9	15.8
Main language spoken						
Foreign	41.4	31.6	27.0	30.8	40.4	28.8
Local	23.6	37.0	39.4	21.0	38.8	40.2
Residence permit						
C permit	39.2	35.6	25.2	31.1	41.5	27.5
B permit	21.6	29.3	49.1	17.5	36.0	46.5
Region of origin						
Germany	7.3	42.5	50.2	11.5	44.2	44.3
France	12.4	37.8	49.8	16.1	27.4	56.5
Italy	50.6	34.1	15.3	42.2	43.4	14.4
Austria	10.5	53.0	36.5	16.8	42.7	40.5
Spain	54.8	33.3	11.9	38.2	47.5	14.4
Portugal	63.3	27.7	9.1	39.5	49.7	10.8
Other EU15/EFTA	12.2	26.2	61.7	15.9	29.3	54.8
Ex-Yugoslavia	36.1	34.2	29.7	27.5	40.2	32.3
Turkey	53.0	28.1	18.9	48.6	36.9	14.6
Other Europe	6.9	29.6	63.5	7.3	25.2	67.5
North Africa	27.4	26.4	46.2	28.3	35.5	36.3
Sub-Saharan Africa	30.7	26.3	43.0	30.1	38.3	31.6
North America	8.0	25.6	66.4	7.2	23.9	69.0
Latin America	29.7	25.0	45.3	23.5	35.4	41.1
Asia/Ex-USSR	36.1	24.6	39.2	23.8	28.8	47.4
Oceania/Others	16.2	28.0	55.8	16.3	28.5	55.2

Source : 2000 Swiss census, Central register of foreigners (RCE)

Note : UQ = under qualified; AM = adequately matched; OQ = overqualified.

Gender differences in overqualification are also noticeable across regions of origin. In 1990, women generally exhibit lower shares of overqualified workers than men do for all regions of origin (excepted Eastern Europe). In 2000, this statement is no more valid: we find higher shares of overqualified workers for women originating from various regions of origin such as France, Eastern Europe and North America. These figures are in line with the fact that, since the 1990s, the feminization of labour migration to Switzerland has been accompanied by an improvement in the educational attainment of the labour force.

Finally, Tables 5 and 6 illustrate the incidence of job-education mismatch among first-generation immigrants by occupational group (based on the 2-digit ISCO code) for 1990 and 2000 respectively.[18] At first sight, the distribution of both men and women across matching categories strongly varies from one occupational group to another. In 1990, we find high shares of overqualified workers in groups such as *legislators and senior officials* (ISCO 11), *general managers* (ISCO 13) and *physical, mathematical and engineering science professionals* (ISCO 21), these shares being smaller among women (excepted in group ISCO 13); for men, we note that working as *corporate manager* (ISCO 12) or *teaching associate* (ISCO 33) also leads to a situation of overqualification in at least half the cases. In 2000, more occupational groups are characterized by high shares of overqualified workers and this pattern is rather similar for both men and women: *corporate manager* (ISCO 12), *general managers* (ISCO 13), *physical, mathematical and engineering science professionals* (ISCO 21), *Life science and health associate professionals* (ISCO 32), *teaching associate professionals* (ISCO 33), *Other associate professionals* (ISCO 34). These high proportions of overqualified workers may originate from various factors. As noted by Nielsen (2009), all groups belonging to the first occupational class *legislators, senior officials and managers* (ISCO 10, 11, 12 and 13) are so heterogeneous in terms of educational requirements that it seems arbitrary to define which levels of education are appropriate for these jobs. Moreover, as it is often posited in some OECD publications (for example, see Dumont and Monso, 2007), occupations included in the three first classes (ISCO 10 to 34) are categorized as skilled; accordingly, these jobs should require more qualifications than others. Given that the realised matches method neglect skill acquisition through experience and on-the-job training (Verhaest and Omey, 2006), this method leads to a systematic overestimate of the incidence of overqualification in jobs with high skill requirements.

Concerning occupations included in the other classes (ISCO 40 to 93), it is worth mentioning that gender differences in terms of overqualification are the largest when working as *office clerks* (ISCO 41) or *drivers and mobile-plant operators* (ISCO 83) in 2000, the shares for women being respectively 20 and 12 percentage points higher than those for men. On the other hand, the proportions of overqualified workers are smaller among women than among men when employed as *models, salespersons and demonstrators* (ISCO 52), with differences being about 20 and 10 percentage points in 1990 and 2000 respectively.

[18]See Table 15 in Appendix for details on the distribution of first-generation immigrants across different occupational groups by census year and gender.

Table 5: Incidence of job-education mismatch by occupation (row percentage), first-generation immigrants with a B or C permit in 1990

	Men			Women		
2-digit ISCO code	UQ	AM	OQ	UQ	AM	OQ
Legislators, senior officials and managers						
11. Legislators and senior officials	11.9	19.0	69.0	13.0	27.3	59.7
12. Corporate managers	19.4	27.5	53.1	25.5	31.8	42.7
13. General managers	4.4	28.9	66.7	9.2	20.0	70.8
Professionals						
21. Physical, mathematical and engineering science professionals	9.7	38.2	52.0	10.8	36.3	52.9
22. Life science and health professionals	4.4	95.6	0.0	9.7	90.3	0.0
23. Teaching professionals	31.6	67.6	0.8	43.9	53.1	3.0
24. Other professionals	20.3	50.4	29.3	25.2	47.4	27.4
Technicians and associate professionals						
31. Physical and engineering science associate professionals	19.8	42.5	37.7	42.0	35.1	22.9
32. Life science and health associate professionals	8.8	68.4	22.8	7.1	71.7	21.2
33. Teaching associate professionals	21.1	28.5	50.4	27.0	38.2	34.8
34. Other associate professionals	17.9	38.8	43.3	19.7	43.8	36.6
Clerks						
41. Office clerks	19.2	52.4	28.4	19.9	54.5	25.6
42. Customer service clerks	53.7	26.5	19.8	57.8	28.9	13.3
Service workers and shop and market sales workers						
51. Personal and protective services workers	29.0	45.9	25.2	35.2	49.9	14.9
52. Models, salespersons and demonstrators	29.6	40.1	30.3	57.4	33.4	9.2
Skilled agricultural and fishery workers						
61. Market-oriented skilled agricultural and fishery workers	61.2	32.3	6.5	61.6	32.4	6.0
Craft and related trades workers						
71. Extraction and building trades workers	44.6	47.3	8.0	58.7	33.0	8.3
72. Metal, machinery and related trades workers	32.0	56.8	11.2	61.9	31.5	6.6
73. Precision, handicraft, printing and related trades workers	30.8	59.4	9.8	65.1	27.4	7.5
74. Other craft and related trades workers	32.9	58.3	8.8	30.4	54.4	15.2
Plant and machine operators and assemblers						
81. Stationary-plant and related operators	32.7	47.7	19.6	57.1	40.0	2.9
82. Machine operators and assemblers	25.3	53.5	21.3	20.4	67.4	12.2
83. Drivers and mobile-plant operators	16.2	59.8	24.1	16.7	52.8	30.6
Elementary Occupations						
91. Sales and services elementary occupations	8.9	63.7	27.4	11.6	78.2	10.3
92. Agricultural, fishery and related labourers	6.6	80.9	12.5	4.1	90.5	5.3
93. Labourers in mining, construction, manufacturing and transport	8.9	67.5	23.6	10.5	74.6	14.9

Source : 1990 Swiss census, Central register of foreigners (RCE)

Note : UQ = under qualified; AM = adequately matched; OQ = overqualified. Only 2-digit occupations with at least 10 observations were considered.

Table 6: Incidence of job-education mismatch by occupation (row percentage), first-generation immigrants with a B or C permit in 2000

	Men			Women		
2-digit ISCO code	UQ	AM	OQ	UQ	AM	OQ
Legislators, senior officials and managers						
10. Not elsewhere classified	12.3	11.3	76.4	13.1	14.7	72.1
11. Legislators and senior officials	20.0	66.3	13.8	43.2	43.2	13.7
12. Corporate managers	17.1	23.5	59.4	18.0	21.8	60.1
13. General managers	12.2	16.7	71.1	16.6	18.3	65.1
Professionals						
21. Physical, mathematical and engineering science professionals	7.2	25.8	67.1	6.1	25.9	68.0
22. Life science and health professionals	5.5	94.5	0.0	5.4	94.6	0.0
23. Teaching professionals	19.4	80.6	0.0	30.4	69.6	0.0
24. Other professionals	19.1	39.2	41.7	18.3	41.1	40.6
Technicians and associate professionals						
30. Not elsewhere classified	37.2	62.8	0.0	22.6	77.4	0.0
31. Physical and engineering science associate professionals	23.3	29.2	47.5	30.4	19.6	50.0
32. Life science and health associate professionals	14.7	25.8	59.5	15.3	25.4	59.3
33. Teaching associate professionals	15.3	16.0	68.7	11.8	27.1	61.1
34. Other associate professionals	16.9	19.2	63.9	13.2	21.8	65.0
Clerks						
40. Not elsewhere classified	24.4	21.1	54.4	12.5	25.0	62.5
41. Office clerks	54.3	22.4	23.3	25.9	31.1	43.0
42. Customer service clerks	54.0	18.9	27.1	53.7	18.3	28.0
Service workers and shop and market sales workers						
51. Personal and protective services workers	31.8	39.3	28.9	23.5	46.5	30.0
52. Models, salespersons and demonstrators	40.2	27.2	32.6	52.3	24.9	22.8
Skilled agricultural and fishery workers						
61. Market-oriented skilled agricultural and fishery workers	72.0	15.8	12.2	66.6	18.3	15.1
Craft and related trades workers						
70. Not elsewhere classified	53.7	34.1	12.2	92.9	7.1	0.0
71. Extraction and building trades workers	56.3	31.5	12.2	66.7	13.5	19.8
72. Metal, machinery and related trades workers	36.8	44.8	18.5	66.3	20.1	13.7
73. Precision, handicraft, printing and related trades workers	39.8	39.8	20.4	63.0	17.3	19.7
74. Other craft and related trades workers	50.9	37.1	12.0	52.0	33.1	14.8

	Men			Women		
2-digit ISCO code	UQ	AM	OQ	UQ	AM	OQ
Plant and machine operators and assemblers						
80. Not elsewhere classified	12.2	57.2	30.6	15.3	57.8	26.9
81. Stationary-plant and related operators	39.3	38.1	22.6	47.2	32.5	20.3
82. Machine operators and assemblers	44.9	36.4	18.6	38.7	46.9	14.3
83. Drivers and mobile-plant operators	56.4	27.8	15.8	53.2	18.9	27.9
Elementary Occupations						
91. Sales and services elementary occupations	43.4	38.6	18.0	25.8	60.6	13.6
92. Agricultural, fishery and related labourers	15.8	70.6	13.6	13.3	77.5	9.2
93. Labourers in mining, construction, manufacturing and transport	22.7	56.7	20.5	17.0	58.5	24.5

Source : 2000 Swiss census, Central register of foreigners (RCE)

Note : UQ = under qualified; AM = adequately matched; OQ = overqualified.

Only 2-digit occupations with at least 10 observations were considered.

4.2 Explaining job-education mismatch

Based on pooled 1990 and 2000 census data, the results of the multinomial logit analysis are given in Table 7 with marginal effects on the probability to be over- or under qualified,[19] reported for the first-generation immigrants of each sex. Gender differences in the estimated marginal effects have been assessed through re-estimating a model on the entire sample with a full set of gender interactions terms; significant differences (at the 5% level) are presented in bold alongside the marginal effect for women.

The number of years spent in Switzerland (labelled YSM) reflects the assimilation process in the host country. The impact of this variable on the likelihood of being overqualified is significantly negative, implying a detrimental effect to those who arrived recently. This effect provides little evidence to the less-than-perfect international transferability of immigrant human capital, as we are not able to identify the level of education and labour experience acquired abroad. On the other hand, earlier cohorts of first-generation immigrants who decided to stay in Switzerland are more likely to be under qualified. This pattern is consistent with the hypothesis of favourable selectivity in migration (Chiswick and Miller, 2009). When comparing the effect of YSM by gender, women show a slightly flatter profile than men which indicates faster adjustment for the latter. For instance, living for 10 years in Switzerland reduces the likelihood of overqualification from six and three percentage points respectively for men and women.

Proficiency in the host country language is another way to examine the assimilation of first-generation immigrants. Speaking the local language as the main language increases the likelihood of being overqualified (while the converse applies to the likelihood of being under qualified). Contrary to assimilation hypothesis, this strange result is however in line with the findings of Battu and Sloane (2004) and Lindley (2009) who studied job-education mismatch among ethnic minorities in Britain and the UK respectively.[20]

[19]The coefficients in a multinomial logit model can not be directly interpreted as those in a linear regression model and, consequently, their marginal effects were calculated. The marginal effects show the change in the probability of interest (in percentage points) caused by the change of one unit in each of the explanatory variables evaluated at mean values of all variables.

[20]It is possible that unobservable factors may simultaneously influence both language proficiency and job matching status, and thus generate such a spurious association.

Interestingly, holding a B permit has a comparable impact: it augments the risk of being overqualified. In other words, C permit holders are favourably selected with respect to B permit holders, which is consistent with the previous result based on the duration of residence.

There is mixed evidence that overqualification is a consequence of labour market rigidities in terms of family commitments. Whatever the gender, having a working spouse (which might spatially constrain the other partner's employment opportunities) is associated with a lower probability of being overqualified; the related marginal effect is actually stronger for women than for men. Interestingly, being married but without spouse (i.e. having probably left the spouse in the country of origin) has a comparable impact for men and women (as the marginal effect for women is not significantly different from that for men): they are between 4 and 5 percentage points less likely to be overqualified, compared to non-married immigrants. The only factor that indicates statistically significant higher risk of overqualification due to family commitments is the number of children below the age of 6 living in the household; this result supports the relatively disadvantaged situation of women with young children in the Swiss labour market (Atukeren and Wirz, 2005).

For men, almost all foreign nationals are more likely to be overqualified than the Italian workers (i.e. the reference group). This result is not astonishing since Italian migrants who constitute one of the main communities arrived in Switzerland after the Second World War are predominantly low-educated (see Tables 13 and 14 in Appendix). As already noted in Table 4, the likelihood of being overqualified is larger among first-generation immigrants from developed countries (e.g. Other EU15/EFTA, North America, Oceania/Others) or Eastern Europe (labelled Other Europe) compared to Italians, the Eastern Europeans being among the most likely to be overqualified. On the other hand, Spaniards and Portuguese are the less likely to be overqualified. Regarding underqualification, the results reveal the opposite: compared to Italians, the likelihood of being under qualified is lower among first-generation immigrants from developed countries and Eastern Europe but higher among those from Spain and Portugal. All these observations are also valid for women.

Table 7: Multinomial logit: determinants of job-education mismatch among first-generation immigrants (marginal effects evaluated at sample means)

	Men		Women	
	UQ	OQ	UQ	OQ
Years since migration				
YSM	0.004***	-0.006***	0.005***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)
YSM^2	-0.000***	-0.000	-0.000*	-0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
Main language spoken				
Foreign	Ref.	Ref.	Ref.	Ref.
Local	-0.029***	0.033***	-0.006	0.015***
	(0.002)	(0.002)	(0.003)	(0.002)
Marital status				
Non-married	Ref.	Ref.	Ref.	Ref.
Married				
> Employed spouse	0.039***	-0.021***	0.019***	-0.044***
	(0.002)	(0.002)	(0.002)	(0.002)
> Un- or non-employed spouse	0.037***	-0.002	0.031***	-0.054***
	(0.003)	(0.002)	(0.005)	(0.004)
> Without spouse	0.052***	-0.051***	0.021***	-0.037***
	(0.003)	(0.003)	(0.005)	(0.003)
Children < 6 in household				
Number	-0.005***	0.009***	-0.010***	0.012***
	(0.001)	(0.001)	(0.002)	(0.002)
Area of residence				
Urban	Ref.	Ref.	Ref.	Ref.
Rural	0.011***	-0.036***	-0.001	-0.019***
	(0.002)	(0.002)	(0.003)	(0.002)
Residence permit				
C permit	Ref.	Ref.	Ref.	Ref.
B permit	-0.018***	0.040***	-0.024***	0.021***
	(0.002)	(0.002)	(0.003)	(0.003)
Census year				
1990	Ref.	Ref.	Ref.	Ref.
2000	0.145***	0.046***	0.067***	0.120***
	(0.002)	(0.001)	(0.002)	(0.002)

	Men		Women	
	UQ	OQ	UQ	OQ
Region of origin				
Germany	-0.250***	0.267***	**-0.165*** **	**0.231*** **
	(0.001)	(0.004)	(0.003)	(0.006)
France	-0.188***	0.232***	**-0.110*** **	**0.284*** **
	(0.002)	(0.005)	(0.004)	(0.007)
Italy	Ref.	Ref.	Ref.	Ref.
Austria	-0.214***	0.227***	**-0.121*** **	**0.243*** **
	(0.002)	(0.005)	(0.004)	(0.008)
Spain	0.034***	-0.062***	**-0.003**	**-0.027*** **
	(0.003)	(0.003)	(0.003)	(0.004)
Portugal	0.111***	-0.126***	**0.073*** **	**-0.093*** **
	(0.003)	(0.003)	(0.004)	(0.003)
Other EU15/EFTA	-0.197***	0.372***	**-0.123*** **	**0.310*** **
	(0.002)	(0.004)	(0.003)	(0.006)
Ex-Yugoslavia	-0.079***	0.080***	**-0.025*** **	**0.116*** **
	(0.002)	(0.003)	(0.003)	(0.004)
Turkey	-0.006	0.035***	**0.078*** **	**-0.006**
	(0.003)	(0.005)	(0.006)	(0.006)
Other Europe	-0.216***	0.422***	**-0.186*** **	**0.512*** **
	(0.002)	(0.006)	(0.003)	(0.007)
North Africa	-0.116***	0.249***	**-0.003**	**0.130*** **
	(0.004)	(0.007)	(0.013)	(0.015)
Sub-Saharan Africa	-0.099***	0.235***	**0.004**	**0.113*** **
	(0.005)	(0.009)	(0.011)	(0.012)
North America	-0.207***	0.404***	**-0.177*** **	**0.451*** **
	(0.003)	(0.007)	(0.005)	(0.010)
Latin America	-0.101***	0.243***	**-0.042*** **	**0.193*** **
	(0.005)	(0.008)	(0.006)	(0.008)
Asia/Ex-USSR	-0.072***	0.224***	**-0.029*** **	**0.230*** **
	(0.003)	(0.005)	(0.005)	(0.007)
Oceania/Others	-0.174***	0.310***	**-0.117*** **	0.321***
	(0.008)	(0.017)	(0.017)	(0.028)
Pseudo R^2	0.107		0.0965	
Percent correctly predicted	53.55		56.02	
Observations	425734		227641	

Source : 1990 & 2000 Swiss censuses, Central register of foreigners (RCE)

Notes : UQ = under qualified; OQ = overqualified; base category = adequately matched.

*** p<0.01, ** p<0.05, * p<0.10, standard errors in parentheses.

Bold: marginal effect for women is significantly different from that for men.

Unreported controls: age, age squared, six dummies for region of residence.

5. Conclusion

5.1 Summary of the results

This study has provided one of the first empirical analysis on the incidence and determinants of job-education mismatch among first-generation immigrants in the Swiss labour market using cross-matched data from two sources of comprehensive information. It has investigated the existence of gender differences in terms of brain waste. Measuring job-education mismatch through the realised matches method, we have shown that Swiss nationals are predominantly well matched whatever the year considered. This pattern is similar for foreigners from the second and intermediate generations, who had completed at least compulsory school in Switzerland. Among first-generation immigrants, however, the shares of those overqualified increased throughout the 1990s, with the largest increase occurring for women. This trend follows from the significant rise in educational attainment among immigrants to Switzerland during a period of economic downturn.

Consistent with the descriptive statistics, the multinomial logit analysis have shown that the likelihood of being overqualified is negatively related to the duration of residence, meaning that more recent cohorts of immigrants are more likely to be overqualified than earlier ones. However, this adjustment process tends to be slower for women relative to men. On the other hand, having dependent children under the age of 6, holding a B permit or coming from developed countries augment the risk of being overqualified. Moreover, our results support the relatively disadvantaged situation of immigrant women with young children in finding a job commensurate with their education. Regarding underqualification, our results reveal the opposite effects than those found for overqualification. In particular, the likelihood of being under qualified increases with the number of years spent in Switzerland or, equivalently, decreases among recent cohorts of immigrants. This pattern is consistent with Chiswick and Miller's findings that support the hypothesis of favourable selectivity in migration.

5.2 Policy recommendations

Even if we have not analysed the labour market consequences of over- and underqualification,[21] our results suggest some policy recommendations in order to improve the job-education matching process for the first-generation immigrants, especially with respect to highly educated women. This is particularly important in the Swiss context where the immigration policy has been almost solely addressed through the management of migration flows without much attempt at developing comprehensive integration policies (Gross, 2006).[22]

As a matter of fact, we should first and foremost examine how to make human capital transferable for immigrants in the host country labour market. One possibility consists in assessing officially foreign qualifications, either before or after immigration. As noted by Nielsen (2009), an official evaluation can help employers identify the true content of immigrant qualifications. Such an evaluation that is carried out before immigration may

[21]Indeed, the Swiss censuses or the RCE do not include information on various measures of labour market outcomes such as earnings and job satisfaction that might be affected by job-education mismatch.

[22]Even if integration has been recognised as a federal task since the late 1990s, the aims and principles of integration have been incorporated for the first time into the *Foreign Nationals Act* of January 2008. The legal framework enables the cantons to promote integration (through, for example, language training and education).

however lead to a more selective migration process if entry is refused to persons whose foreign qualifications are negatively assessed (as in Australia, New Zealand and Canada). Accordingly, a negative evaluation would rule out cases where recently arrived migrants get a first job for which they are overqualified but then move to a better job with additional time spent in the host country. In case there is a significant share of overqualified immigrants already living in the host country, the recognition (i.e. ex-post evaluation) of foreign qualifications provides a means to enhance the portability of immigrant human capital and, therefore, to reduce the extent of brain waste. In Switzerland, such an instrument exists and currently applies to diplomas from non-EU/EFTA countries in a unilateral way.[23] According to numerous studies (for a review, see Chicha and Deraedt, 2009), the procedure of recognition is often seen as an obstacle course given its complexity and lack of clarity. Indeed, it involves too many actors (instead of being centralized in one responsible body) and criteria for a successful evaluation are sometimes restrictive (e.g. in terms of required documents for application). As a consequence, this procedure deters immigrants from applying for recognition, which is likely to make overqualification last for them. Even if, over the last years, the Swiss authorities increased the number of countries for which they grant mutual recognition (through bilateral agreements with the European Union), there is still need for extending international cooperation in that field.

In case of non-recognition, another possibility that may improve the transferability of immigrant human capital is to offer additional training. Such measure could serve to upgrade foreign qualifications that are less productive than those acquired in the host country, thus ensuring a better matching process between immigrants and jobs. Moreover, despite our empirical findings, intensive national language training should be compulsory in order to enable immigrants to enter the host labour market as quickly as possible. All these measures involve costly investments that firms and/or public authorities may fund. In Switzerland, the Federal Office of Migration encourages programmes offered by the cantons by providing them with financial assistance. Firms, however, will be reluctant to invest in transferable human capital because they risk losing their investment by training workers that might seek employment opportunities in other countries.

Apart from promoting the portability of immigrant credentials, any policy that aims at reducing the incidence of brain waste should also remove institutional barrier to equitable access to job opportunities for immigrant women with young children. In Switzerland, women often have to cope with an insufficient offer of child care services that are, moreover, not affordable (Banfi et al., 2009). The public authorities could tackle these issues by providing more child care facilities; alternatively, firms should adapt their organization structures in order to enable women to conciliate professional and family responsibilities. As pointed out by Atukeren and Wirz (2005), motivating women and providing incentives to firms so that new mothers remain integrated into the labour market will improve the utilization of women's investment in education and, therefore, bring benefit to the society as a whole.

To sum up, improving the transferability of immigrant human capital in the host country labour market should be a top priority. For achieving this goal, policy makers could implement a more selective admission system based on the relevance of foreign-acquired qualifications or/and the needs of the economy in the host country. With respect to overqualified immigrants already living the host country, they should ensure the recognition of their education whatever the origin of its acquisition. In case of non-recognition, they could support newly arrived immigrants to pursue further training and undertake language courses in order to enhance their foreign-acquired qualifications in the

[23]According to the agreement on the free movement of persons between Switzerland and the EU (in force since 1st June 2002), mutual recognition is granted to state diplomas from EU/EFTA countries.

host labour market. Policies intended to give equal opportunity to immigrant women after giving birth are also essential in mitigating any negative effects of brain waste. As the number of skilled immigrants has been increasing substantially and is expected to rise further, implementing any of these measures is of crucial importance to prevent them from present and future forms of deskilling.

References

Atukeren, E. and Wirz, A. (2005). *An analysis of perceived overqualification in the Swiss labor market*. Economics Bulletin, 9(2):1–10.

Banfi, S., Farsi, M., and Filippini, M. (2009). *An empirical analysis of child care demand in Switzerland*. Annals of Public and Cooperative Economics, 80(1):37–66.

Battu, H. and Sloane, P. J. (2004). *Over-education and ethnic minorities in Britain.* Manchester School, 72(4):535–559.

Bauer, T. K. (2002). *Educational mismatch and wages: a panel analysis*. Economics of Education Review, 21(3):221–229.

Borghans, L. and Grip, A. d. (2000). The debate in economics about skill utilization. In Borghans, L. and Grip, A. d., editors, *The Overeducated Worker?* The Economics of Underutilization of Skills, pages 3–23. Edward Elgar, Cheltenham.

Borjas, G. J. (2004). *Labor Economics*. Third edition.

Chevalier, A. (2003). *Measuring over-education*. Economica, 70(279):509–531.

Chicha, M. T. and Deraedt, E. (2009). *Genre, migration et déqualification: des trajectoires contrastées - Etude de cas de travailleuses migrantes à Genève*. Cahiers des migrations internationales 97, Organisation international du Travail (OIT), Genève.

Chiswick, B. R. (1978). *The effect of americanization on the earnings of foreign-born men.* Journal of Political Economy, 86(5):897–921.

Chiswick, B. R. and Miller, P. W. (2008). *Why is the payoff to schooling smaller for immigrants?* Labour Economics, 15(6):1317–1340.

Chiswick, B. R. and Miller, P. W. (2009). *The international transferability of immigrants' human capital*. Economics of Education Review, 28(2):162–169.

Coulon De, A., Falter, J.-M., Flückiger, Y., and Ramirez, J. (2003). *Analyse des différences de salaires entre population suisse et étrangère*. In Wicker, H.-R., Fibbi, R., and Haug, W., editors, Les migrations et la Suisse, pages 263–288. Seismo, Zurich.

Devereux, P. J. (2000). *Task assignment over the business cycle*. Journal of Labor Economics, 18(1):98–124.

Dumont, J.-C. and Monso, O. (2007). *Matching educational background and employment: A challenge for immigrants in host countries*. SourceOECD Transition Economies, pages 156–196.

Frank, R. H. (1978). *Why women earn less: The theory and estimation of differential overqualification*. American Economic Review, 68(3):360–73.

Frenette, M. (2004). *The overqualified Canadian graduate: the role of the academic program in the incidence, persistence, and economic returns to overqualification.* Economics of Education Review, 23(1):29–45.

Friedberg, R. M. (2000). *You can't take it with you? immigrant assimilation and the portability of human capital*. Journal of Labor Economics, 18(2):221–251.

Green, F. and McIntosh, S. (2007). *Is there a genuine under-utilization of skills amongst the over-qualified?* Applied Economics, 39(4):427–439.

Green, F. and Zhu, Y. (2010). *Overqualification, job dissatisfaction, and increasing dispersion in the returns to graduate education.* Oxford Economic Papers, 62(4):740-763.

Gross, D. M. (2006). *Immigration policy and foreign population in Switzerland.* Policy Research Working Paper Series 3853, The World Bank.

Hartog, J. (2000). *Over-education and earnings: where are we, where should we go?* Economics of Education Review, 19(2):131–147.

Huth, P. (2004). *Marché du travail en Suisse – salaires élevés et faible réglementation*. Economic Briefing 37, Credit Suisse, Economic & Policy Consulting.

Kiker, B. F., Santos, M. C., and de Oliveira, M. M. (1997). *Overeducation and undereducation: Evidence for Portugal*. Economics of Education Review, 16(2):111–125.

Lindley, J. (2009). *The over-education of UK immigrants and minority ethnic groups: Evidence from the labour force survey*. Economics of Education Review, 28(1):80–89.

Mattoo, A., Neagu, I. C., and Özden, C. (2008). *Brain waste? Educated immigrants in the us labor market*. Journal of Development Economics, 87(2):255–269.

McGuinness, S. (2006). *Overeducation in the labour market*. Journal of Economic Surveys, 20(3):387–418.

Nielsen, C. (2009). *Immigrant over-education: evidence from Denmark.* Journal of Population Economics, 24(2):499-520.

Pastor, E. (2002). *Science et technologie en Suisse, bilan de la dernière décennie 1990-2000/2001*. Office fédéral de la statistique (OFS), Neuchâtel.

Pecoraro, M. (2005). *Les migrants hautement qualifiés*. In Haug, W. and Wanner, P., editors, *Migrants et marché du travail:* Compétences et insertion professionnelle des personnes d'origine étrangère en Suisse, number 6, pages 71–110. Neuchâtel.

Pecoraro, M. (2009). *Overeducation and skill requirements: Applying an alternative measure of job-education mismatch*. Mimeo, Department of Economics, Université catholique de Louvain.

Pecoraro, M. and Fibbi, R. (2010). *Highly skilled migrants in the Swiss labour market. With a special focuson migrants from developments countries*. In Tejada, G. and Bolay, J.-C., editors, Scientific diasporas as development partners. Skilled migrants from Colombia, India and South Africa in Switzerland: empirical evidence and policy responses. Chapter 4, pages 179-195. Peter Lang.

Riaño, Y. and Baghdadi, N. (2007). *Understanding the labour market participation of skilled immigrant women in Switzerland: The interplay of class, ethnicity, and gender*. Journal of International Migration and Integration, 8(2):163–183.

Verdugo, R. R. and Verdugo, N. T. (1989). *The impact of surplus schooling on earnings: Some additional findings.* The Journal of Human Resources, 24(4):629–643.

Verhaest, D. and Omey, E. (2006). *Measuring the incidence of over- and undereducation.* Quality and Quantity, 40(5):783–803.

Wajda, A. (1992). *LinkPro user's manual, version 1*. Winnipeg, Manitoba.

Appendix

Aggregate level of education in the Swiss censuses

0. No education	
I. Compulsory School	
II. Upper secondary level	
	1. Vocational education (Apprenticeship, Full-time vocational school)
	2. Maturity
III. Tertiary level	
	1. Vocational high education
	2. Technical or vocational school
	3. University

Composition of the final sample

Table 8: Distribution of the final sample by nationality and generation (column percentage), permanent resident population

	1990		2000	
	Men	Women	Men	Women
Swiss nationals	78.2	82.8	81.2	85.1
Foreign nationals				
First	19.6	15.3	15.0	11.9
Intermediate	0.8	0.7	0.9	0.7
Second	1.3	1.1	2.9	2.3
Effectif total	1.342.889	863.170	1.082.442	801.562

Source : 1990 & 2000 Swiss censuses, Central register of foreigners (RCE)

Note : Swiss nationals also include naturalized foreigners.

Country or region of origin groups

EU15/EFTA

- Germany
- France
- Italy
- Austria
- Spain
- Portugal

Other EU15/EFTA

- Belgium, Denmark, Finland, Greece, United Kingdom, Ireland, Luxembourg, Netherlands, Sweden, Iceland, Liechtenstein, Norway.

Ex-Yugoslavia

- Slovenia, Croatia, Bosnia-Herzegovina, Federal Republic of Yugoslavia (Serbia and Montenegro since 2003), Macedonia.

Turkey

Other Europe

- Malta, Poland, Hungary, Cyprus, Slovakia, Czech Republic, Bulgaria, Romania, Albania, Andorra, Monaco, San Marino, Vatican City.

North Africa

- Algeria, Libya, Morocco, Tunisia, Egypt, Western Sahara.

Sub-Saharan Africa

- Sudan, Benin, Ivory Coast, Gambia, Ghana, Guinea-Bissau, Guinea, Cape Verde, Liberia, Mali, Mauritania, Niger, Nigeria, Burkina Faso, Senegal, Sierra Leone, Togo, Ethiopia, Djibouti, Burundi, Kenya, Comoros, Madagascar, Malawi, Mauritius, Mozambique, Zimbabwe, Rwanda, Zambia, Seychelles, Somalia, Tanzania, Uganda, Eritrea, Equatorial Guinea, Angola, Gabon, Cameroon, Congo-Brazzaville, Congo-Kinshasa, Sao Tome and Principe, Chad, Central African Republic, Botswana, Lesotho, South Africa, Namibia, Swaziland.

North America

- Canada, United States of America.

Latin America

- Argentina, Bolivia, Brazil, Chile, Ecuador, Guyana, Colombia, Paraguay, Peru, Suriname, Uruguay, Venezuela, Costa Rica, El Salvador, Guatemala, Belize, Honduras, Mexico, Nicaragua, Panama, Bahamas, Barbados, Dominican Republic, Haiti, Jamaica, Cuba, Trinidad and Tobago, Dominica, Grenada, Antigua and Barbuda, Saint Lucia, Saint Vincent and the Grenadines, Saint Kitts and Nevis.

Asia

- China, Japan, Taiwan, Mongolia, North Korea, South Korea, Afghanistan, Bhutan, Sri Lanka, India, Iran, Maldives, Nepal, Pakistan, Bangladesh, Brunei, Myanmar, Indonesia, Cambodia, Laos, Malaysia, Philippines, Singapore, Thailand, Vietnam, Bahrain, Iraq, Israel, Yemen, Jordan, Qatar, Kuwait, Lebanon, Oman, United Arab Emirates, Saudi Arabia, Syria, Palestine.

Ex-USSR

- Estonia, Latvia, Lithuania, Moldova, Russia, Ukraine, Belarus, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, Armenia, Azerbaijan, Georgia.

Oceania/Others

- Australia, New Zealand, Fiji, Nauru, Vanuatu, Papua New Guinea, Tonga, Samoa, Solomon Islands, Tuvalu, Kiribati, Marshall Islands, Micronesia, Palau, unknown State.

Additional descriptive statistics

Table 9: Educational attainment by nationality (column percentage), permanent resident population

	1990		2000	
	Men	Women	Men	Women
Swiss nationals				
No education	0.4	0.5	0.6	0.9
Compulsory School	13.1	23.7	7.8	15.9
Vocational education	58.2	56.9	51.6	53.0
Maturity	3.0	7.9	4.9	12.4
Vocational high education	11.0	4.8	15.5	6.9
Technical or vocational school	5.5	1.5	8.5	3.7
University	8.8	4.6	11.2	7.1
Foreign nationals				
No education	4.2	6.4	5.3	6.2
Compulsory School	42.4	54.1	30.7	35.3
Vocational education	34.0	26.2	28.8	24.6
Maturity	2.4	4.0	6.9	10.7
Vocational high education	5.9	3.9	6.9	5.6
Technical or vocational school	2.6	1.0	5.7	5.0
University	8.4	4.5	15.7	12.6

Source : 1990 & 2000 Swiss censuses, Central register of foreigners (RCE)

Note : Swiss nationals also include naturalized foreigners.

Table 10: Educational attainment by generation (column percentage), permanent foreign resident population

	1990		2000	
Generation	Men	Women	Men	Women
First				
No education	4.6	7.0	6.4	7.5
Compulsory School	45.0	57.1	35.0	39.0
Vocational education	31.1	22.3	21.5	15.9
Maturity	2.4	4.1	7.4	11.6
Vocational high education	5.7	3.9	5.7	5.5
Technical or vocational school	2.5	1.0	5.9	5.6
University	8.8	4.7	18.2	14.9
Intermediate				
No education	1.6	2.6	2.0	3.2
Compulsory School	25.3	42.5	22.6	33.9
Vocational education	56.2	46.2	52.1	46.3
Maturity	2.4	2.9	4.8	6.3
Vocational high education	7.0	2.6	8.2	3.9
Technical or vocational school	2.8	0.7	3.8	2.2
University	4.7	2.5	6.5	4.2
Second				
No education	0.7	0.7	0.9	0.9
Compulsory School	14.5	21.7	11.0	16.4
Vocational education	64.1	66.5	58.6	62.5
Maturity	2.4	4.0	4.9	7.8
Vocational high education	9.2	3.7	12.9	6.3
Technical or vocational school	4.1	0.9	5.8	2.5
University	5.0	2.5	5.9	3.6

Source : 1990 & 2000 Swiss censuses, Central register of foreigners (RCE)

Table 11: Educational attainment by individual characteristics (row percentage), first-generation immigrant men with a B or C permit in 1990

	0	I	II1	II2	III1	III2	III3
Years since migration							
0-4	3.1	45.0	25.3	3.3	5.7	2.6	15.1
5-9	4.4	48.8	26.4	3.1	5.3	2.1	9.9
10-14	4.9	46.0	28.5	2.9	5.6	2.4	9.7
15-19	6.1	47.5	30.0	2.0	5.3	2.0	7.1
20-24	5.5	42.4	36.6	1.5	5.8	2.9	5.3
25-29	5.7	43.1	39.0	1.1	5.9	2.4	2.8
30 +	3.4	36.4	47.0	1.0	6.7	2.9	2.5
Main language spoken							
Foreign	5.5	52.8	27.4	2.1	3.8	1.4	7.1
Local	2.3	25.8	40.1	3.2	10.4	5.1	13.1
Residence permit							
C Permit	5.1	45.8	33.2	1.9	5.6	2.3	6.0
B Permit	3.2	43.1	25.8	3.5	5.9	2.8	15.7
Region of origin							
Germany	0.1	4.4	46.6	2.6	15.3	9.0	22.0
France	0.7	16.2	42.1	5.5	12.3	5.2	18.1
Italy	6.0	56.3	31.0	1.0	3.3	0.5	1.8
Austria	0.4	10.4	59.3	1.6	11.6	7.6	9.3
Spain	6.2	64.3	24.4	1.5	1.9	0.4	1.4
Portugal	6.6	72.4	16.9	1.9	1.4	0.2	0.6
Other EU15/EFTA	1.4	13.5	20.6	5.0	12.9	8.5	38.1
Ex-Yugoslavia	4.7	50.7	35.9	1.6	3.6	0.9	2.7
Turkey	8.8	59.7	22.2	2.9	1.6	0.7	4.0
Other Europe	0.3	8.6	29.6	9.5	15.5	8.1	28.5
North Africa	3.0	28.8	30.7	7.6	9.1	3.6	17.2
Sub-Saharan Africa	2.1	30.7	23.6	10.1	7.8	3.2	22.4
North America	0.1	8.7	8.5	4.5	8.3	3.6	66.3
Latin America	1.5	32.8	22.4	8.6	9.5	3.0	22.3
Asia/Ex-USSR	6.4	30.1	21.9	5.6	5.9	3.5	26.7
Oceania/Others	0.3	11.8	19.7	3.4	10.0	5.2	49.6

Source : 1990 Swiss censuses, Central register of foreigners (RCE)

Table 12: Educational attainment by individual characteristics (row percentage), first-generation immigrant women with a B or C permit in 1990

	0	I	II1	II2	III1	III2	III3
Years since migration							
0-4	4.5	53.5	21.8	4.9	5.7	1.4	8.3
5-9	6.4	57.9	19.4	5.1	4.6	1.1	5.6
10-14	7.8	57.1	20.5	4.6	4.0	0.9	5.2
15-19	8.5	59.7	20.5	3.7	3.2	0.8	3.6
20-24	8.1	56.6	25.4	3.5	2.9	0.8	2.7
25-29	8.8	58.9	25.6	2.4	2.4	0.5	1.3
30 +	5.7	59.9	28.4	2.1	2.2	0.5	1.2
Main language spoken							
Foreign	8.4	65.2	16.2	3.2	2.6	0.6	3.8
Local	3.2	35.5	38.6	6.3	7.6	2.0	6.9
Residence permit							
C Permit	7.8	59.8	21.7	3.7	3.1	0.7	3.2
B Permit	4.1	47.6	24.5	5.5	6.7	1.7	9.8
Region of origin							
Germany	0.2	11.7	55.1	5.6	12.9	3.9	10.5
France	1.3	24.2	38.5	12.2	9.5	2.1	12.2
Italy	9.8	73.3	13.2	1.8	0.7	0.2	1.0
Austria	0.8	31.2	50.4	5.3	6.9	1.1	4.4
Spain	8.4	76.2	12.0	1.8	0.6	0.2	0.7
Portugal	8.1	79.4	8.4	2.9	0.6	0.2	0.5
Other EU15/EFTA	2.3	18.0	34.0	10.5	15.8	2.4	17.1
Ex-Yugoslavia	6.4	61.7	24.8	2.1	2.4	0.7	1.9
Turkey	16.0	68.7	10.9	2.2	0.6	0.2	1.3
Other Europe	0.6	10.7	29.2	20.7	13.0	4.2	21.7
North Africa	5.4	38.5	31.3	5.4	4.9	1.0	13.6
Sub-Saharan Africa	4.3	38.3	32.9	9.5	5.5	1.6	7.9
North America	0.0	7.4	17.7	6.7	16.7	1.7	49.8
Latin America	3.0	38.2	27.8	11.0	5.8	2.2	12.0
Asia/Ex-USSR	10.0	29.7	34.4	6.5	5.3	1.2	12.9
Oceania/Others	0.0	9.2	24.8	5.5	10.1	2.8	47.7

Source : 1990 Swiss censuses, Central register of foreigners (RCE)

Table 13: Educational attainment by individual characteristics (row percentage), first-generation immigrant men with a B or C permit in 2000

	0	I	II1	II2	III1	III2	III3
Years since migration							
0-4	2.6	18.7	13.1	6.8	6.3	9.8	42.7
5-9	5.8	38.1	19.3	10.0	5.4	5.0	16.4
10-14	7.4	41.4	20.1	8.7	5.1	4.7	12.8
15-19	8.1	42.3	21.1	7.3	5.1	4.6	11.6
20-24	9.2	38.6	23.9	6.2	5.5	5.0	11.6
25-29	10.5	40.5	26.1	4.8	5.1	4.4	8.5
30 +	7.5	35.8	37.7	3.5	6.9	4.9	3.7
Main language spoken							
Foreign	8.8	43.7	18.3	6.9	3.3	3.4	15.6
Local	2.9	22.4	26.1	8.1	9.2	9.5	21.8
Residence permit							
C Permit	7.4	39.9	24.2	6.9	5.6	4.9	11.2
B Permit	3.8	22.8	14.9	8.7	6.0	8.3	35.7
Region of origin							
Germany	0.2	2.3	25.6	4.9	12.8	15.0	39.3
France	1.0	9.3	30.3	9.9	10.4	10.1	29.0
Italy	9.3	52.3	23.3	4.4	3.2	2.3	5.1
Austria	0.7	7.3	49.9	3.4	12.7	10.7	15.4
Spain	10.9	57.7	20.0	4.2	2.0	1.3	4.0
Portugal	11.9	70.7	9.9	5.2	1.0	0.5	0.7
Other EU15/EFTA	1.2	7.8	10.6	6.3	8.2	13.8	52.2
Ex-Yugoslavia	8.0	41.5	26.0	13.8	4.1	2.5	4.3
Turkey	14.5	53.5	14.7	6.4	1.5	1.6	7.7
Other Europe	0.4	4.9	15.6	16.6	7.0	9.0	46.5
North Africa	4.1	30.5	17.9	14.5	6.3	5.2	21.6
Sub-Saharan Africa	4.4	33.6	15.5	12.2	5.2	6.0	23.2
North America	0.3	5.6	3.7	4.2	3.5	5.5	77.3
Latin America	3.7	29.9	14.6	13.8	4.7	5.5	27.9
Asia/Ex-USSR	9.0	34.2	11.9	7.2	3.7	4.8	29.2
Oceania/Others	1.1	9.0	11.8	8.0	8.0	5.3	56.8

Source : 2000 Swiss censuses, Central register of foreigners (RCE)

Table 14: Educational attainment by individual characteristics (row percentage), first-generation immigrant women with a B or C permit in 2000

	0	I	II1	II2	III1	III2	III3
Years since migration							
0-4	2.7	22.3	14.3	11.8	6.5	8.8	33.6
5-9	5.9	40.4	15.4	13.3	5.7	5.5	13.8
10-14	7.9	43.3	15.0	13.1	5.9	5.2	9.7
15-19	9.5	45.3	14.7	11.2	5.5	5.2	8.6
20-24	12.2	44.1	15.6	10.6	5.4	4.4	7.8
25-29	14.9	48.0	15.7	8.6	4.2	3.3	5.4
30 +	11.6	49.5	23.7	6.9	3.3	2.5	2.5
Main language spoken							
Foreign	10.5	47.7	11.3	10.3	3.1	3.4	13.8
Local	3.1	26.8	22.5	13.5	8.9	8.8	16.4
Residence permit							
C permit	9.1	44.6	16.8	10.9	5.3	4.8	8.6
B permit	4.0	27.2	14.1	13.1	6.0	7.5	28.1
Region of origin							
Germany	0.4	5.1	31.3	11.3	13.3	12.1	26.6
France	1.3	16.2	16.4	17.0	11.4	12.8	24.9
Italy	15.0	59.8	10.4	6.2	1.5	1.9	5.2
Austria	1.6	16.8	40.8	13.3	10.0	6.3	11.2
Spain	14.0	62.7	10.6	5.5	1.1	1.2	4.9
Portugal	11.8	73.6	5.7	6.6	0.7	0.7	0.9
Other EU15/EFTA	1.7	11.9	13.8	14.6	10.4	15.3	32.4
Ex-Yugoslavia	8.5	48.7	17.1	16.0	3.8	2.2	3.6
Turkey	22.1	55.5	9.6	5.2	0.6	0.7	6.4
Other Europe	0.4	8.1	15.1	30.6	7.5	6.4	31.9
North Africa	6.0	43.1	15.6	14.1	2.8	3.1	15.3
Sub-Saharan Africa	6.4	47.4	15.4	12.2	4.3	3.7	10.6
North America	0.4	4.6	3.9	7.9	4.9	8.8	69.5
Latin America	4.9	40.6	13.1	13.5	3.3	3.9	20.6
Asia/Ex-USSR	7.2	29.8	12.6	11.5	4.1	5.5	29.3
Oceania/Others	0.8	11.3	9.2	11.3	6.7	6.7	54.0

Source : 2000 Swiss censuses, Central register of foreigners (RCE)

Table 15: Distribution of first-generation immigrants across occupational groups (column percentage)

	1990		2000	
2-digit ISCO code	Men	Women	Men	Women
Legislators, senior officials and managers				
10. Not elsewhere classified	-	-	2.0	0.9
11. Legislators and senior officials	0.1	0.1	0.1	0.1
12. Corporate managers	6.8	1.8	7.8	3.2
13. General managers	0.0	0.0	2.3	1.3
Professionals				
21. Physical, mathematical and engineering science professionals	3.8	0.8	6.4	1.9
22. Life science and health professionals	0.6	0.5	1.0	1.5
23. Teaching professionals	1.2	1.5	1.8	2.8
24. Other professionals	1.7	1.3	3.4	3.7
Technicians and associate professionals				
30. Not elsewhere classified	-	-	0.0	0.0
31. Physical and engineering science associate professionals	3.3	2.3	3.5	2.2
32. Life science and health associate professionals	1.1	7.5	1.9	10.2
33. Teaching associate professionals	0.4	0.9	0.6	1.8
34. Other associate professionals	3.2	2.2	4.3	4.7
Clerks				
40. Not elsewhere classified	-	-	0.1	0.0
41. Office clerks	4.8	6.4	5.9	7.6
42. Customer service clerks	0.6	1.6	0.8	2.3
Service workers and shop and market sales workers				
51. Personal and protective services workers	5.5	15.1	9.2	21.5
52. Models, salespersons and demonstrators	1.2	4.5	1.6	6.2
Skilled agricultural and fishery workers				
61. Market-oriented skilled agricultural and fishery workers	1.2	0.2	1.6	0.4
Craft and related trades workers				
70. Not elsewhere classified	-	-	0.1	0.0
71. Extraction and building trades workers	15.8	0.3	13.5	0.2
72. Metal, machinery and related trades workers	10.4	2.0	9.0	1.3
73. Precision, handicraft, printing and related trades workers	1.3	0.8	1.3	1.2
74. Other craft and related trades workers	3.4	4.5	3.1	2.9
Plant and machine operators and assemblers				
80. Not elsewhere classified	-	-	2.3	0.4
81. Stationary-plant and related operators	0.6	0.1	1.0	0.1
82. Machine operators and assemblers	5.7	4.2	3.8	2.8
83. Drivers and mobile-plant operators	4.7	0.1	5.2	0.1

	1990		2000	
2-digit ISCO code	Men	Women	Men	Women
Elementary Occupations				
91. Sales and services elementary occupations	1.9	13.0	3.0	17.0
92. Agricultural, fishery and related labourers	0.2	0.1	0.4	0.2
93. Labourers in mining, construction, manufacturing and transport	20.4	28.2	2.9	1.3

Source : 1990 & 2000 Swiss censuses, Central register of foreigners (RCE)

Only 2-digit occupations with at least 10 observations were considered.