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Kiel Working Paper No. 951

The labor market performance of first-generation immigrants:
Evidence for Switzerland

by

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October 1999

Abstract[1]

This paper is concerned with the study of the labor market performance of immigrants. The unemployment rate is used as an indicator and natives as the reference group for the analysis. The analysis proceeds in two steps. In a first step, probit regressions on the unemployment probabilities are estimated for the pooled cross-section of 1991 and 1995, taking into account nationality- and gender-specific differences. In a second step, and based on the finding that unemployment rates usually differ significantly across sectors, the asymmetry in the sectoral distribution of immigrants with respect to natives is assessed. The empirical results indicate that Swiss and males exhibit significantly lower unemployment probabilities than immigrants and females. Furthermore, immigrants from Non-European countries have not only a higher unemployment probability than natives, but also the largest asymmetry in the employment structure.

Keywords: International Migration, Labor Supply, Employment Determinantion, Unemployment,

JEL-Classification: F22, J22, J23, J64

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An earlier version of this paper was prepared for the Third International Metropolis Conference, 30 November – 3 December, 1998 - Zichron Ya'acov, Israel. The author would like to thank Claudia M. Buch, Don Devoretz, Axel Schimmelpfennig, George Sheldon, Thomas Straubhaar, and the participants of a seminar at the Institute for Economic Research Halle for their helpful comments and suggestions. All remaining errors and inaccuracies are solely in my own responsibility.

1 Introduction

Immigration is an important economic and political issue for Switzerland. In the past 50 years alone, the share of foreigners in total population has grown to 20 per cent by 1998. An even more pronounced picture emerges when the share of foreigners in total employment is considered, which amounts to almost 33 per cent. As a result, a number of studies have been conducted to investigate the impact of immigration on the Swiss economy. A study on the growth, business cycle, and structural effects of migration in Switzerland, conducted by Schwarz (1988), concluded that growth and structural change are affected negatively by immigration. Furthermore, according to this study, immigrants have declined to provide a cyclical buffer function for natives over time through increased emigration (immigration) during recession (boom) periods.

Kugler and Spycher (1992), Bürgenmaier et al (1992), and Butare and Favarger (1992) studied the allocational effects of migration in Switzerland. Kugler and Spycher showed that skilled immigrants and natives are complements, while unskilled natives and immigrants are substitutes. The latter authors found a complementary (substitutional) relationship between capital and skilled (unskilled) labor in Switzerland for the period of 1950 to 1986. Bürgenmaier et al also showed that there is a marked correlation between changes in elasticities of complementarity and substitution on the one hand and the stock of immigrant workers on the other hand. Kohli (1993, 1997) showed in an open-economy model that studies based on closed-economy models neglect possible interactions between international factor movements and foreign trade. His results indicate that immigration may have substantial displacement effects if there is downward wage rigidity. In the case of wage flexibility, migration has only a slight negative effect on the incomes of native workers, while capital owners benefit from migration.

Finally, there is a strand of research that has focused on the distributional effects of migration. Based on cross-sectional data from the 1990 Swiss consumer survey, Weber (1993) and Straubhaar and Weber (1994) estimated the transfer balance for natives and immigrants. Their results show that natives gained from the presence of resident foreigners in 1990, mainly through social security insurance and old age pensions contributions.

While these papers have been concerned with a direct assessment of the economic effects of immigration, this paper goes one step back and studies the labor market performance of immigrants relative to that of natives. Despite the considerable attention this topic has received in international academic research (for a survey see Borjas, 1994, and Zimmermann, 1993), this issue has been neglected so far in migration research on Switzerland. As a result, this paper contributes to close this gap and provides new information on the underlying factors that de-

termine the impact of immigrants on the Swiss economy. The unemployment rate is used an indicator of the labor market performance. To study the determinants of unemployment, a binomial probit model is applied. The probit model is estimated for the pooled sample of the two cross-sections 1991 and 1995, to evaluate whether the labor market performance of immigrants and natives has changed over time, as unemployment rates have surged significantly from 1991 to 1995. Based on the typical finding of sectorally diverging unemployment rates, the degree of labor market segmentation is assessed by means of the so called 'dissimilarity-index', to provide information on the asymmetry in the sectoral distribution of immigrants and natives.

The data used in this paper are drawn from the Swiss Labor Force Survey (SLFS).[2] The SLFS covers only the resident population, i.e. Swiss and immigrants holding an annual or a residence permit, there are no information available on seasonal workers and commuters. To omit heterogeneity problems between first- and second-generation immigrants, the analysis focuses on the employment performance of first-generation immigrants, i.e. immigrants who were either born abroad or were at least 16 years of age, when they came to Switzerland. Finally, the analysis is confined to persons aged 16 to 64. Two main results emerge from the empirical analysis. First, Swiss and males exhibit significantly lower unemployment probabilities than immigrants and females. Second, immigrants from Non-European countries have not only a higher unemployment probability than natives, but also the largest asymmetry in the employment structure relative to natives.

The rest of the paper is structured as follows. In the *second section*, we present some descriptive statistics on the individual characteristics of immigrants and natives. In the *third section*, probit regressions are estimated to analyze whether there are significant differences in the unemployment probabilities between immigrants and natives as well as to provide information on the relative importance of the different determinants. In the *fourth section*, complementary evidence on the asymmetry in the sectoral distribution of immigrants relative to natives is provided. The *fifth section* concludes the paper.

2 Descriptive Statistics

In this section, descriptive statistics on the educational attainment, the sectoral employment shares and the unemployment rates and duration are presented. With respect to educational attainment, Table 1 shows that there are nationality-specific differences in the educational attainment of males and females. Table 1 also reveals that immigrants from Northern

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[2] For information on the structure of the SLFS, see SFSO (1996).

European countries are comparatively higher skilled than immigrants from other countries. An explanation for this result can be found in the higher average educational level in these countries as well as in the recruitment duality of Swiss companies, with Northern Europeans being recruited mainly for high-skilled jobs. The comparison of the skill levels of immigrants and natives shows that immigrants are not only more concentrated in the lowest educational segments, but also in the highest. This result is mainly due to the above average share of low skilled (high skilled) immigrants from Southern and non-European countries (Northern European countries). Finally, aside from nationality-specific differences one can also observe gender-specific differences in educational attainment, with the share of females in the highest educational segments significantly below that of males. Based on these findings, it can be expected that the supposedly negative effect of the skill level on the unemployment probability is stronger for natives and males than for immigrants and females.

Table 2 presents some stylized facts on the unemployment stance. There are two factors that determine the unemployment stance of an individual: the risk of becoming unemployed and the likelihood of finding a job. These two factors can be approximated by the unemployment rate and the duration of unemployment. As can be seen from Table 2, the rate as well as the duration of unemployment are highest for immigrants from Southern and non-European countries. Besides these nationality-specific differences, gender- as well as immigrant-native-specific differences can be observed. As a result, a higher unemployment probability for immigrants compared to natives, for females compared to males and for Non-European compared to Northern and Southern European immigrants can be expected.

Concluding this section, descriptive statistics on the sectoral employment shares are presented. Table 3 shows that differences in skill levels are reflected in the relative sectoral employment shares of the different nationality- and gender-specific. While immigrants from Southern Europe are concentrated mainly in low-skill intensive sectors such as manufacturing, construction or wholesale and retail business, the opposite holds for immigrants from Northern Europe and natives alike, although this association is more pronounced for males than for females. These findings indicate that the dissimilarity index is likely to be lower for Northern European immigrants than for Southern and Non-European immigrants.

3 Unemployment probability

In what follows, we are concerned with the empirical analysis of the labor market performance. The unemployment probability is used as a measure of the performance of immigrants and natives. It should be noted, however, that the probability of becoming unemployed is not equivalent to the unemployment risk, as the latter is a flow variable, measuring the pro-

bability of becoming unemployed in a given period of time, while the former is a stock variable, measuring the probability of being unemployed at the time the SLFS is conducted.

To analyze the employment performance a qualitative response model is used, namely a binary dependent variable model.[3] In this kind of model, the dependent variable, y, may take on only two values – one can think of y as a dummy variable representing the occurrence of an event, or a choice between two alternatives. To estimate such a model, one cannot apply a linear regression, for mainly two reasons. Using a linear regression model would be inappropriate, as there are a number of problems associated with it, namely a non-normaly distributed and heteroskedastic error term. Additionally, the fitted value of y is not bound to lie between zero and one in a linear regression model.

As a result, a specification is adopted that is designed to handle the specific requirements of binary dependent variables. It is assumed that the probability of observing a value of one (being unemployed) is given as

$$(1) \qquad \Pr(y_i = 1 | x_i, \beta) = 1 - F(-x'\beta)$$

where F is a continuous, strictly increasing function that yields a real value in the range from zero to one. This function also provides information on the type of binary model that is applied. The parameters of this model can be estimated by maximum likelihood, with the likelihood function given as

$$(2) \qquad l(\beta) = \log L(\beta) = \sum_{i=0}^{n} y_i \left(1 - F(-x'\beta)\right) + (1 - y_i) \log F(-x'\beta).$$

This specification of the binary model can be motivated as a latent variable specification. Assume that there is an unobserved latent variable y_i^* that is linearily related to x

$$(3) \qquad y_i^* = x_i'\beta + \varepsilon_i$$

where ε_i is a random disturbance. In this case, the observed dependent variable is determined by whether y_i^* exceeds a threshold value

$$(4) \qquad y_i = \begin{cases} 1 & \text{if} \quad y_i^* > 0 \\ 0 & \text{if} \quad y_i^* \leq 0 \end{cases}$$

In eq. (4), the threshold is set equal to zero, but the choice of a threshold variable is irrelevant, so long as a constant is included in x_i. In this case

$$(5) \qquad \Pr(y_i = 1 | x_i \beta) = \Pr(y_i^* > 0) = \Pr(x_i'\beta + u_i > 0) = 1 - F_u(-x_i'\beta)$$

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[3] See Greene (1993: 640).

where F_u represents the cumulative distribution function of u. In this paper, this function is specified as a probit, i.e. the cumulative distribution function for the standard normal distribution, is assumed for the F function.

The dependent variable in this paper is the unemployment probability *UNEMPL* which assumes a value of one if a person is unemployed and a value of zero if the person is employed at the date of the survey. The following exogenous variables are included. First, age *AGE* and age-squared *AGESQ* of the individuals are included, to account for the non-linear influence of age on the unemployment probability. As the analysis in this paper is based on a pooled cross-section, the duration and risk component of unemployment cannot be disentangled. This implies that the age effect is ambiguous, as on the one hand, the risk of becoming unemployed is higher for young persons as compared to older, while on the other hand, the duration of unemployment usually increases with age.[4]

As a second individual-specific variable, the skill profile is considered, which is approximated by the educational attainment of the individuals. Three dummy variables are used to capture the effect of schooling on the unemployment probability. *SCH1* indicates compulsory education only, *SCH2* represents a high-school degree, and *SCH3* master degree. As mentioned in the previous section, the skill effect is likely to be negative, as the risk as well as the duration of unemployment are presumably higher for low-skilled than for high-skilled. In the case of foreigners, one could also presume an insignificant skill effect as a result of the incomplete inability of foreigners to transfer their skills from the home to the host country. Finally, an insignificant or negative skill effect could also be an indicator for so-called mismatch-unemployment, which describes a situation in which skill profiles of workers and skill requirements of employers do not correspond.

Aside from these two individual specific factors, the macroeconomic environment also plays an important role in explaining unemployment probabilities. As an indicator of the prevailing economic conditions, unemployment rates at the state level *UNPL* are used. It is likely that there is a positive relationship between the level of state unemployment rates and individual unemployment probabilities. Finally, a number of dummy variables are used. As the analysis is a pooled cross-section for the years 1991 and 1995, a dummy *YEAR_95* was introduced. As UNPL and YEAR_95 both capture a similar effect, namely the change in macroeconomic conditions from 1991 to 1995, only one variable could be included to avoid problems related to multicollinearity. The probit regressions were run under both specifications, but due to the better fit of the regression only the results for the specification with UNPL are presented in what follows. Additionally, a nationality dummy *SWISS* for natives and a gender

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4 See Franz (1991).

dummy *SEX* for males are introduced for the pooled estimation. Finally, two dummy variables for immigrants from Northern Europe *NTHEU* and Southern Europe *STHEU* are included, with immigrants from Non-European countries *OTHCT* as base category, to account for differences between nationality groups.

The empirical analysis proceeds as follows. In a first step, the probit model is estimated for the pooled sample of immigrants and natives. Interaction effects are included to test for the significance of differences in the parameters between natives and immigrants. A likelihood-ratio test is conducted to test for parameter stability. In a second step, the probit model is estimated separately for immigrants and natives, controlling for gender-specific differences. The descriptive statistics are summarized in Table 4. As can be seen, unemployment rates have doubled between 1991 and 1995 for natives as well as for immigrants, with the test statistic indicating a significant difference in the mean values. A second noteworthy issue concerns the changes in the individual characteristics that occurred between 1991 and 1995. The test for equality of means shows that some significant changes have occured over this period for natives as well as for immigrants. While for natives, the age and gender structure has changes significantly, there has been a significant decline in the average number of high-skilled immigrants in the sample. Based on the data used in this paper, it is not clear whether this result is due to an increase in the immigration of low-skilled or the emigration of high-skilled foreigners. For both groups, a deterioration in the macroeconomic environment can be observed, as measured by the unemployment rate in their respective state of residence. Finally, the test statistic indicates that both for 1991 and 1995, immigrants and natives differ significantly in their individual characteristics as well as in their unemployment probabilities.

Table 5 displays the ML estimation results for the pooled sample of immigrants and natives for the period 1991 and 1995. As can be seen in the left panel, age has a significantly negative but decreasing effect on the unemployment probability, i.e. the negative effect reverses over time. The coefficients on the skill variables indicate that only high-skilled face a significantly lower unemployment probability compared to low-skilled. In contrast, the coefficient of the macroeconomic climate indicator has a significantly positive sign, which implies that the higher the regional unemployment rate, the larger the probability for an individual to be unemployed. Finally, the gender- and nationality-specific dummy variables indicate that Swiss and males are significantly less likely to be unemployed compared to foreigners and females. These results are reconfirmed by the descriptives presented above. The use of interaction effects in the right panel of Table 5 shows that only AGE and AGESQ bear a significantly different impact for natives and foreigners. As can be seen, the positive effect of AGE is significantly smaller and the negative effect of AGESQ significantly larger for natives than for foreigners.

After the discussion of the results for the pooled sample of immigrants and natives, we now turn to the discussion of separate estimation results for natives and foreigners. In Table 6, the age effect for natives turns out to be insignificant. Running separate regressions for males and females, which is indicated by a significant test-statistic of the likelihood-ratio test, reveals that the age effect is significant for males as well as for females, but with opposing signs (see Table A1 in the Appendix). As a result, the pooled regression yields insignificant regression coefficients. The estimation results indicate that while for males the unemployment probability increases over time, it decreases for females. The latter effect could be due to a selection bias, with females increasingly dropping out of the labor force over time as they become unemployed. As in the pooled sample of natives and foreigners, only high-skilled face a significantly lower unemployment probability, although Table A1 reveals that medium-skilled individuals also bear a lower probability compared to low-skilled in the case of females. The unfavorable economic conditions are again positively correlated with the probability of becoming unemployed. This effect is stronger for males than for females as can be seen from the right panel in Table 6. Finally, the gender-specific dummy indicates that males have a significantly lower unemployment probability compared to females.

In Table 7 the estimation results for foreigners are depicted. As in Table 5, a decreasingly negative effect of age on the unemployment probability can be observed. In contrast to natives, no qualitative difference in the age effect between females and males can be observed. The skill level has no significant effect on the unemployment probability, which could be due to a lack in the transferability of human capital, thereby eliminating the potentially positive effect of education. Economic conditions have a positive effect for females as well as for males, although the right panel indicates that the effect is larger for males. Based on the estimation results in Table 7, no gender-specific differences in the unemployment probability can be detected. Finally, the nationality-specific dummy variables show that immigrants from Northern and Southern European countries exhibit significantly lower unemployment probabilities compared to immigrants from Non-European countries.

The analysis in this section has revealed that there are not only significant nationality- and gender-specific differences in the unemployment probabilities of immigrants and natives, but also that the relative weight of the respective determinants differs.

4 Labor Market Segmentation

Based on the typical finding of sectorally diverging unemployment rates, the degree of labor market segmentation is analyzed in this section, to provide information on the asymmetry in the sectoral distribution of immigrants and natives. The degree of labor market segmentation

is measured by the concentration of immigrants in selected sectors relative to natives.[5] The use of a stock concept, however, provides only information on the degree of the asymmetry of the sectoral employment distribution at a certain point in time. A more accurate picture of the extent of labor market segmentation could be gained by using data on inter-sectoral labor mobility, i.e. by using a flow concept. To be able to assess the extent of segregation between immigrants and natives, it is necessary to have a measure of the distribution of the employed over the different sectors. The literature usually distinguishes between two indices to analyze this issue.[6] One is called *Dissimilarity-Index D*, which can be traced back to Duncan and Duncan (1955), the other *G-Segregation-Index* G_s which was developed by Butler (1987) and further elaborated by Silber (1989a, 1989b).

As a result of the large correspondence between the dissimilarity and the G-segregation index, both deriving from the literature on income distribution, only the former is used in what follows.[7] Duncan and Duncan (1955) were the first to use the insights of this literature for the analysis of labor market segmentation by referring to the traditional Lorenz curve of income distribution analysis in the deduction of their concept of the segregation curve. The index *D* is defined as follows:

$$(1) \qquad D = 0.5\sum_{i=1}^{n}\left|\frac{F_i}{F} - \frac{N_i}{N}\right|,$$

with F_i and N_i being the number of foreign and native workers in sector i and F and N being the total workforce of immigrants and natives. If a Lorenz-type segregation curve is constructed for the different sectors based on the respective distributions, then the index can be understood as the largest vertical distance between this curve and the diagonal. More intuitively, the index can be interpreted as the share of natives or foreigners that have to change

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5 The literature is by and large focused on questions related to gender-specific labour market segmentation. For an overview see Taubmann and Wachter (1986).

6 See Boisso et al (1994), Deutsch et al (1994), Flückiger et al (1995) and Silber (1989a, 1989b).

7 The G-Segregation Index differs from the Dissimilarity Index in that it accounts for the relative importance of the different sectors in total employment (see Flückiger et al, 1995). The G-Segregation Index corresponds to the weighted Gini-Index of the immigrant/native relation F_i/N_i, so that

$$G_s = 0.5\sum_{i=1}^{n}\sum_{j=1}^{n}\frac{N_i}{N}\cdot\frac{N_j}{N}\left|\frac{F_i/F - F_j/N_j}{F/N}\right|.$$

To simplify the calculation, Silber (1989a, 1989b) proposed the following rearrangements in martix notation:

$G_s = \left(\frac{N_i}{N}\right)' \cdot G \cdot \left(\frac{F_i}{F}\right) = n' Gf$. For the elements of matrix *G* holds that $g_{ij} = \begin{cases} 0 & \text{if } i = j \\ -1 & \text{if } i < j \\ 1 & \text{if } i > j \end{cases}$.

See Boisso et al (1994).

their jobs, to allow for an equilibrium in the employment shares between immigrants and natives in the different sectors.

The analysis of labor market segmentation is based on the methodology of the 'General Nomenclature of Economic Sectors' (ASWZ 85) of the Swiss Federal Statistical Office (SFSO). To provide for a differentiated analysis of sector specific segregation on the one hand, and to ensure a sufficient number of observations for the individual sectors on the other hand, the 'two-digit' definition of economic sectors is used to measure labor market segmentation. The data used for the calculation of the index D are drawn from the 1991 and 1995 wave of the SLFS. The analysis is constrained to full-time employed, as the employment level is likely to have an influence on the sectoral employment shares. Using two waves of the SLFS allows for a qualitative assessment of intertemporal changes in the extent of labor market segmentation.

The different outcomes of the index D can be interpreted as follows. A value of zero indicates identical employment shares of natives and foreigners in the different sectors. A positive value, in contrast, implies that there is a divergence in the employment shares between natives and immigrants. The closer the index is to one, the larger the discrepancy in employment shares. At a value of one, complete sectoral segregation between immigrants and natives would prevail. As mentioned above, the employment distribution of natives is used as the reference value for the calculation of the dissimilarity index.

The results in Table 8 can be summarized as follows. First, a substantial convergence in the employment structure between natives and immigrants, mainly for males, occurred between 1991 and 1995.[8] Second, differences between natives and immigrants are larger for males than for females. This result is due to the larger sectoral dispersion of male as compared to female employment. Third, there are also substantial differences in sectoral segregation between the different nationality groups. This is especially true for immigrants from non-European countries.

While Table 8 provides answers on the extent of labor market segmentation, it provides no information about the sectors responsible for the diverging employment shares. This issue is important, though, as a large employment concentration of foreigners in sectors that require a high (low) skill profile cannot only lead to an increase in sector specific segregation, but can also imply an improvement (deterioration) of the employment performance of immigrants. Table 2 reveals that immigrants from Southern and Non-European countries are much more heavily concentrated in the industrial sector than natives. Immigrants from Northern Europe, in

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[8] It should be mentioned, however, that in the context of this assimilation process, an 'upgrading' as well as a 'downgrading' in the employment structure of immigrant workers can occur.

contrast, exhibit a stronger employment concentration in the service sector, especially in the banking, insurance and real estate business, but also in other services, and the wholesale and retail trade. Finally, natives exhibit higher employment shares in the agricultural industry as well as in the civil service, which is in part due to legal restrictions on foreigner employment.

These results therefore indicate a link between the unemployment probability and thus the labor market performance, as the high unemployment probabilities of immigrants from Southern European and Non-European countries coincide with a high employment share of these immigrants in sectors with high unemployment risk.

5 Conclusions

This paper is concerned with the analysis of the labor market performance of immigrants. The unemployment rate, which measures the probability of being unemployed at a certain point in time, is used as an indicator to analyze the labor market performance. Natives are used as the reference group for this analysis. The analysis proceeds in two steps. In a first step, probit regressions on the unemployment probabilities are estimated for the pooled cross-section of 1991 and 1995, with nationality- and gender-specific differences being taken into account. In a second step, and based on the finding that unemployment rates usually differ significantly across sectors, the asymmetry in the sectoral distribution of immigrants with respect to natives is assessed.

The findings of the paper can be summarized as follows. The analysis of the unemployment probabilities revealed that there are significant nationality- and gender-specific differences in the unemployment probabilities of immigrants and natives. Swiss as well as males exhibit significantly lower unemployment probabilities than immigrants and females. There are differences in the relative weight attached to the determinants for the respective gender- and nationality-specific subsamples. While for natives the age effect is only significant if the probit regression is estimated separately for females and males – with a decreasingly negative effect for males and decreasingly positive effect for females – it is significant for foreigners. The impact of the skill level, in contrast, is only significant and negative for native females. The insignificant effect for immigrants can be attributed to a lack of skill transferability from the home to the host country. Finally, the calculations of the dissimilarity index indicate that a substantial convergence in the employment structure between immigrants and natives occurred between 1991 and 1995. Nevertheless, marked differences between the three nationality groups remain, with the most pronounced divergence being observed for immigrants from Non-European countries.

The finding that immigrants exhibit an inferior labor market performance as measured by

the unemployment probability compared to natives provides insights on the possible impact of immigrants on the Swiss economy. While immigrants still seem to provide a cyclical buffer function, as reflected by their significantly higher unemployment probability, immigrants have substituted emigration with unemployment in the host country. As the unemployment rate has increased dramatically over the 1990s, it is likely that the transfer balance which favored natives in 1990, as shown by Straubhaar and Weber, has been negatively affected in the meantime. These considerations must be interpreted with caution, however, as the analysis in this paper showed that looking at the aggregate immigrant sample disguises significant nationality- and gender-specific differences.

Tables

Table 1 — Educational attainment of employed natives and foreigners, 1995 (in %)

Nationality Groups	Educational Attainment 1	2	3	4	5	6
Males						
Northern Europe	4.8	25.7	14.6	18.5	30.9	5.5
Southern Europe	42.7	27.7	9.4	4.2	2.5	13.5
Non-Europe	14.8	29.0	10.7	8.5	20.1	16.9
Foreigners	24.7	27.3	11.3	9.8	15.3	11.6
Swiss	7.4	46.4	13.0	20.1	9.5	3.7
Females						
Northern Europe	7.4	26.5	26.7	8.2	19.6	11.5
Southern Europe	54.0	15.0	9.0	1.1	1.7	19.2
Non-Europe	30.7	28.5	14.3	5.3	4.9	16.4
Foreigners	34.3	21.2	16.2	4.3	8.4	15.7
Swiss	18.2	42.1	24.1	5.3	5.0	5.3

Source: SLFS (1995), own calculations
Notes: Employed: Persons aged 16 to 64
Educational attainment: 1=Compulsory education 2=Vocational education, 3=Upper-level secondary general education, 4=Higher vocational education, 5=University education, 6=No answer, other education

Table 2 — Unemployment rates and duration of unemployment for natives and foreigners, 1995 (in %)

Nationality Groups	UR	Duration of unemployment (in months)			
		< 3	3 – 12	12 – 24	> 24
Males					
Northern Europe	2.4	46.7	21.6	31.6	
Southern Europe	5.9	23.1	29.3	39.1	8.5
Non-Europe	9.6	20.4	44.4	15.3	19.9
Foreigners	5.6	25.0	33.1	29.3	12.6
Swiss	1.9	37.3	32.4	23.1	7.2
Females					
Northern Europe	1.4		76.1	4.1	19.8
Southern Europe	8.9	26.3	33.1	33.1	7.5
Non-Europe	11.5	30.0	37.9	5.1	27.0
Foreigners	6.9	25.7	37.6	22.0	14.7
Swiss	3.0	25.4	36.6	18.2	19.8

Source: SLFS (1995), own calculations

Notes: UR = Unemployment rate: Unemployed (according to definition by SLFS)/Work force (employed and unemployed according to definition by SLFS aged 16 to 64)

Table 3 — Employed natives and foreigners grouped by economic sectors, 1995 (in %)

Nationality Groups	Economic Sectors 1	2	3	4	5	6	7	8	9
Males									
Northern Europe	0.5		27.3	6.7	19.4	1.0	17.4	25.3	2.3
Southern Europe	0.9	0.3	35.7	27.2	16.9	3.1	8.0	6.9	1.0
Non-Europe	0.2		35.7	11.8	20.8	7.3	9.4	12.3	2.5
Foreigners	0.7	0.2	32.9	17.5	18.4	3.2	11.4	14.0	1.7
Swiss	6.1	1.4	22.3	9.3	16.1	8.5	16.0	13.9	6.4
Females									
Northern Europe			10.4	0.2	19.0	4.6	9.8	49.0	7.1
Southern Europe	0.2		26.2		29.4	3.5	12.5	27.4	0.9
Non-Europe			30.1		24.0	3.7	10.0	30.5	1.7
Foreigners	0.9		21.4	0.1	24.6	3.8	11.1	35.0	3.1
Swiss	4.4	0.3	11.5	2.6	24.7	4.1	15.4	32.9	4.1

Source: SLFS (1995), own calculations

Notes: Employed: Individuals aged 16 to 64

Economic Sectors: 1=Agriculture, hunting and forestry, 2=Electricity, gas and water supply, mining, 3=Manufacturing, 4=Construction, 5=Wholesale and retail trade, hotel and restaurant industry, repair industry, 6=Transport, storage and communication, 7=Financial intermediation, real estate, renting and business activities, 8=Other services (health, education, research), 9=Public administration

Table 4 — Descriptive statistics

Variables	Natives		Foreigners	
	1991	1995	1991	1995
Sample size	5791	12172	1048	1579
UNEMPL	0.01	0.02***	0.03†††	0.06***/†††
	(0.10)	(0.14)	(0.16)	(0.24)
AGE	37.77	38.77***	40.22†††	40.82†††
	(11.88)	(11.49)	(10.42)	(10.33)
AGESQ/100	15.68	16.35***	17.26†††	17.73†††
	(9.56)	(9.37)	(8.69)	(8.79)
SCH1	0.12	0.12	0.40†††	0.43†††
	(0.32)	(0.33)	(0.49)	(0.50)
SCH2	0.67	0.66	0.36†††	0.38†††
	(0.47)	(0.47)	(0.48)	(0.49)
SCH3	0.21	0.21	0.24††	0.19***/††
	(0.41)	(0.41)	(0.43)	(0.39)
UNPL	1.18	4.05***	1.52†††	4.78***/†††
	(0.71)	(1.82)	(0.78)	(1.94)
SEX	0.54	0.56*	0.61†††	0.59†††
	(0.50)	(0.50)	(0.49)	(0.49)
NTHEU_IC			0.33	0.33
			(0.47)	(0.47)
STHEU			0.50	0.46*
			(0.50)	(0.50)
OTHCT			0.18	0.21**
			(0.38)	(0.41)

Source: SLFS (1991, 1995), own calculations

Notes: Standard errors in parentheses; Test for equality of means between 1991 and 1995 for immigrants and natives: * 10 % level of significance, ** 5 % level of significance, *** 1 % level of significance; Test for equality of means between immigrants and natives for 1991 and 1995: † 10 % level of significance, †† 5 % level of significance, ††† 1 % level of significance

Table 5 — Unemployment probabilities for pooled sample of natives and foreigners

Variables	Pooled Sample		Variables	Pooled Sample	
	Slope b (abs. t-values)	Marginal effects		Slope b (abs. t-values)	Marginal effects
Sample size	20590		Sample size	20590	
CONSTANT	–1.265*** (5.39)	–0.0549	CONSTANT	–0.210 (0.34)	–0.0090
AGE	–0.029** (2.41)	–0.0012	AGE	–0.091*** (2.93)	–0.0039
AGESQ/100	0.030** (2.02)	0.0013	AGESQ	0.107*** (2.93)	0.0046
SCH2	–0.058 (1.08)	–0.0025	SCH2	–0.041 (0.42)	–0.0017
SCH3	–0.198*** (2.86)	–0.0086	SCH3	–0.087 (0.73)	–0.0038
UNPL	0.095*** (10.26)	0.0041	UNPL	0.104*** (5.49)	0.0045
SEX	–0.145*** (3.49)	–0.0063	SEX	–0.049 (0.55)	–0.0021
SWISS	–0.409** (7.78)	–0.0177	SWISS	–1.657** (2.46)	–0.0713
			S_AGE	0.077** (2.28)	0.0033
			S_AGESQ	–0.097** (2.41)	–0.0042
			S_SCH2	–0.055 (0.47)	–0.0024
			S_SCH3	–0.178 (1.20)	–0.0076
			S_UNPL	–0.011 (0.50)	–0.0005
			S_SEX	–0.119 (1.17)	–0.0051
LR–Test	9.82		Critical value	14.067	
Log–L	–2020.247		Log–L	–2015.336	
Pseudo–R^2	0.161		Pseudo–R^2	0.164	

Source: SLFS (1991, 1995), own calculations
Notes: * 10 % level of significance, ** 5 % level of significance, *** 1 % level of significance

Table 6 — Unemployment probabilities for natives

Variables	Natives		Variables	Natives	
	Slope b (abs. t-values)	Marginal effects		Slope b (abs. t-values)	Marginal effects
Sample size	17963		Sample size	17963	
CONSTANT	–1.867*** (7.55)	–0.0715	CONSTANT	–2.783*** (7.44)	–0.1034
AGE	–0.014 (1.06)	–0.0005	AGE	0.041** (2.06)	0.0015
AGESQ/100	0.010 (0.61)	0.0004	AGESQ	–0.059** (2.32)	–0.0022
SCH2	–0.096 (1.45)	–0.0037	SCH2	–0.137* (1.69)	–0.0051
SCH3	–0.265*** (3.06)	–0.0101	SCH3	–0.417*** (3.17)	–0.0155
UNPL	0.093*** (8.74)	0.0036	UNPL	0.079*** (5.43)	0.0029
SEX	–0.168*** (3.55)	–0.0064	SEX	1.568*** (3.13)	0.0583
			M_AGE	–0.111*** (4.04)	–0.0041
			M_AGESQ	0.137*** (3.98)	0.0051
			M_SCH2	0.180 (1.23)	0.0067
			M_SCH3	0.364* (1.90)	0.0135
			M_UNPL	0.031 (1.46)	0.0012
LR–Test	19.555		Critical value	12.592	
Log–L	–1538.430		Log–L	–1528.650	
Pseudo–R^2	0.139		Pseudo–R^2	0.149	

Source: SLFS (1991, 1995), own calculations

Notes: * 10 % level of significance, ** 5 % level of significance, *** 1 % level of significance

Table 7 — Unemployment probabilities for foreigners

Variables	Foreigners		Variables	Foreigners	
	Slope b (abs. t-values)	Marginal effects		Slope b (abs. t-values)	Marginal effects
Sample size	2627		Sample size	2627	
CONSTANT	0.102 (0.16)	0.0085	CONSTANT	–0.911 (0.91)	–0.0727
AGE	–0.095*** (3.03)	–0.0079	AGE	–0.021 (0.40)	–0.0017
AGESQ/100	0.118*** (3.17)	0.0098	AGESQ	–0.007 (0.11)	0.0006
SCH2	–0.010 (0.10)	–0.0008	SCH2	–0.137 (0.83)	–0.0110
SCH3	–0.035 (0.26)	–0.0029	SCH3	–0.138 (0.63)	–0.0110
UNPL	0.108*** (5.57)	0.0090	UNPL	0.071** (2.37)	0.0057
SEX	–0.093 (1.02)	–0.0077	SEX	0.812 (0.60)	0.0648
NTHEU_IC	–0.568*** (4.43)	–0.0473	NTHEU_IC	–0.401** (2.03)	–0.0320
STHEU	–0.402*** (3.66)	–0.0344	STHEU	–0.310* (1.82)	–0.0248
			M_AGE	–0.084 (1.22)	–0.0067
			M_AGESQ	0.131 (1.58)	0.0105
			M_SCH2	0.206 (0.96)	0.0165
			M_SCH3	0.131 (0.47)	0.0104
			M_UNPL	0.064 (1.61)	0.0051
			M_NTH	–0.016 (0.62)	–0.0205
			M_STH	–0.011 (0.45)	–0.0149
LR–Test	12.443		Cricital value	15.507	
Log–L	–465.749		Log–L	–459.5277	
Pseudo–R^2	0.237		Pseudo–R^2	0.253	

Source: SLFS (1991, 1995), own calculations

Notes: * 10 % level of significance, ** 5 % level of significance, *** 1 % level of significance

Table 8 — Dissimilarity-Index D: Results on sectoral labour market segregation

Nationality Groups	DISSIMILARITY-INDEX D					
	Females		Males		Total	
	1991	1995	1991	1995	1991	1995
Northern Europe	0.264	0.278	0.307	0.301	0.234	0.248
Southern Europe	0.290	0.281	0.370	0.345	0.319	0.285
Non-Europe	0.468	0.428	0.382	0.395	0.354	0.365

Source: SLFS (1995, 1991), own calculations

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Appendix

Table A1 — Unemployment probabilities for male and female natives and foreigners

Variables	Male Natives		Female Natives		Male Foreigners		Female Foreigners	
	Slope b (abs. t-values)	Marginal effects	Slope b (abs. t-values)	Marginal effects	Slope b (abs. t-values)	Marginal effects	Slope b (abs. t-values)	Marginal effects
Sample size	9952		8011		1578		1049	
CONSTANT	–1.216***	–0.0358	–2.783***	–0.1359	–0.099	–0.0071	–0.911	–0.0846
	(3.65)		(7.44)		(0.11)		(0.91)	
AGE	–0.069***	–0.0020	0.041**	–0.0020	–0.104***	–0.0075	–0.021	–0.0019
	(3.72)		(2.06)		(2.37)		(0.40)	
AGESQ/100	0.078***	0.0023	–0.059**	–0.0029	0.138***	0.0100	0.007	0.0007
	(3.36)		(2.32)		(2.75)		(0.111)	
SCH2	0.044	–0.0013	–0.137*	–0.0067	0.069	0.0049	–0.137	–0.0128
	(0.36)		(1.69)		(0.50)		(0.83)	
SCH3	–0.053	–0.0016	–0.417***	–0.0204	–0.007	–0.0005	–0.138	–0.0128
	(0.38)		(3.17)		(0.04)		(0.63)	
UNPL	0.111***	0.0033	0.079***	0.0039	0.135***	0.0097	0.071**	0.0066
	(6.99)		(5.43)		(5.19)		(2.37)	
NTHEU_IC					–0.657***	–0.0473	–0.401**	–0.0372
					(3.81)		(2.05)	
STHEU					–0.496***	–0.0357	–0.310*	–0.0288
					(3.37)		(1.82)	
Log–L	–689.814		–838.836		–259.356		–200.172	
Pseudo–R^2	0.133		0.146		0.263		0.228	

Source: *SLFS (1991, 1995), own calculations*
Notes: ** 10 % level of significance, ** 5 % level of significance, *** 1 % level of significance*