

FIEF Working Paper Series 2002



No. 185

How Long Does it Take to Integrate? Employment Convergence of Immigrants And Natives in Sweden*

by

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Abstract

This study examines employment convergence between immigrants and natives, by gender and region of origin, using data with annual information (1990-2000) on more than 200,000 individuals of which over 19,000 were born abroad. Duration of residence is found to have a significant effect on employment chances up to and including the first 25 years in Sweden. Assuming homogeneous human capital and time effects, immigrant groups with over twenty years residency continue to show a significant employment gap to natives. Duration of residence, however, has greater explanatory power for East- and non-European immigrants as seen by significantly improved employment ratios with time in Sweden. No notable gender differences in employment convergence patterns are found.

Keywords: Immigration; Employment; Discrimination; Gender

JEL classification: J7; J15; J16; J21; J61

December 18, 2002

* I am grateful to Mahmood Arai, Karsten Albaek, Alireza Behtoui and Roger Vilhelmsson for helpful comments as well as to seminar participants at the Department of Economics and the Swedish Institute for Social Research (SOFI), Stockholm University and the Trade Union Institute for Economic Research (FIEF).

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1. Introduction

Immigration implies an initial loss of human capital, as pre-immigration skills are not directly transferable between national markets. In terms of employment levels, this implies an initial employment gap to natives that should decrease with time in the host country. The rate of this attenuation may however differ by region of origin. This study aims to analyse the employment convergence patterns of different immigrant groups to natives in the Swedish labor market. Using a longitudinal data set covering the period 1990-2000, with information on over 200,000 individuals, of which more than 19,000 were born abroad, employment equations were estimated, by gender and region of origin. These estimations control specifically for the effect of duration of residence, i.e., for the number of years an individual has lived in Sweden, but also for a number of personal and demographic characteristics thought to influence employment chances, as well as potential time-invariant individual effects.

Previous studies on the Swedish labor market have focused on income or wage differentials between immigrants and natives (Aguilar & Gustafsson, 1994; Edin & Åslund, 2001; Edin, Lalonde & Åslund, 2000; le Grand & Szulkin, 2000; Österberg, 2000). These studies find that a large proportion of the income differential is driven by differences in employment levels between immigrants and natives. This is contrary to the U.S. case, where recent studies indicate that employment differentials between immigrants and natives disappear after ten years of residence (Chiswick *et al.*, 1997) while the earnings gap of more recent immigrant waves to natives is expected to persist throughout immigrants' working lives (Borjas, 1995). Immigrants to Sweden have, after the mid-1970's, experienced an increasing employment gap, on average, to natives (Arai, Regner & Schröder, 2000; Ekberg, 1991; Lundborg, 2000; Vilhelmsson, 2000; Wadensjö, 1997). The importance of controlling for region of origin and duration of residence has been noted where recent work shows that given the negative penalty of being born abroad, the employment gap decreases with duration of residence (Arai, Regner & Schröder, 2000). There are, however, no systematic analyses on the interaction between these two variables on employment probabilities. Which, if any, of the immigrant groups converge with time in the host country to native employment levels? Are there differences in employment convergence patterns by region of origin or by gender? How persistent are employment differentials to natives?

This study confirms that duration of residence has a significant effect on employment chances for immigrants up to and including the first 25 years in Sweden. After twenty years residency in Sweden, immigrants continue to observe a significant employment gap to natives the size of which varies by region of origin. This effect differs by region of origin and has larger explanatory power for East and non-European immigrants than Nordic and West European immigrants. No notable gender differences in employment convergence patterns are found.

The remainder of the paper is as follows. The next section gives a short review of the previous theoretical and empirical work on employment convergence. Section 3 describes the data and empirical set-up. The results are presented and discussed in Section 4, which is followed by concluding remarks in Section 5.

2. Origin and gender in employment convergence

Employment convergence theory is centered on the concept of country-specific, or local, human capital. Immigrants arrive to a host country with less information about the functioning of the local labor market, fewer connections and lower than native levels of language skills and cultural and social know-how. These differences are assumed to attenuate with time spent in the host country as immigrants acquire the skills necessary for integration in the local labor market. However, the rate of this attenuation may differ by region of origin. Individuals of Nordic origin for example are assumed to quickly acquire the local human capital skills relevant to the Swedish job market, whereas those from non-European, Non-OECD countries may require a greater number of years to reach similar levels. In addition, economic and political factors within both the source and the host country will influence the selection of individuals who choose to immigrate and the motivation these immigrants have to invest in country-specific human capital (Borjas, 1987).

On the demand side, employers may more readily recognize and accept foreign credentials from regions in close proximity to Sweden, while being unsure of the value of work-related characteristics and credentials of immigrants from more geographically and culturally distant regions. In addition, institutional features making it more expensive to fire employees may promote risk adverse behaviour on the part of employers. Over time,

as immigrants invest in local human capital and productivity-related information about immigrants improves as these groups enter the labor market, one would expect convergence among the differing immigrant groups towards each other and towards comparable native employment levels.

A previous study on employment convergence in the U.S., Chiswick *et al.* (1997) finds that although immigrants to the U.S. initially had difficulty in finding work, employment differentials declined sharply with duration in the host country and disappeared by ten years of residence in the U.S. Some regional differences in employment probabilities were found, notably that in comparison to European/Canadian immigrants, Asian immigrants had lower employment ratios while Mexican immigrants had similar employment ratios.

Gender differences in labor force participation patterns have been established in numerous studies (See for example, Arrufat & Zabalza, 1986; Eissa & Liebman, 1996; Keane & Moffit, 1998). Due to childbirth considerations and greater time investments to the home, women have traditionally had lower employment rates than their male counterparts and a greater sensitivity to economic stimuli. In addition, female immigrants may have different employment patterns relative native women as well as relative their male immigrant counterparts. There is some indication, for example, that wives in immigrant families finance their husband's investment in local human capital, the so called family investment hypothesis (Baker & Benjamin, 1997; Duleep & Sanders, 1993). This implies that immigrant women more readily lower their reservation wages and, at least initially, have higher employment rates than their male counterparts. A recent Swedish study comparing immigrant woman married to natives, contra immigrant women married to immigrants, finds no support for this hypothesis (Rashid, 2002). Cultural differences may also play a greater roll in choices concerning labor market participation for immigrant woman. Experience in the host country is likely to alter these norms and over time, the trade off between labor and leisure time is likely to become similar to the norms of women born in the host country (Shoeni, 1998). U.S. studies confirm that employment levels among immigrant women significantly increase with greater duration of residence and that disparities among women born in different countries diminish over time (Long, 1980; MacPherson & Stewart, 1989; Schoeni, 1998)

Previous studies on the Swedish labor market noted that prior to 1970, immigrants in general and female immigrants in particular, had higher age-specific employment levels than their native counterparts (Ekberg, 1999; Wadensjö, 1997). Female immigrants from Greece, Poland and former

Yugoslavia, in particular, had higher than average annual incomes due to higher employment frequencies than native women (Ekberg, 1991). This trend was, after the mid 1970's, reversed both in terms of employment levels and annual income levels. In 1989, immigrants noted a 17 percent lower average employment level than natives, despite the economic boom of 1988/1989 (Ekberg, 1991; see also Lundborg (2000) for analysis of 1990's labor market).¹

The decline in immigrant employment levels vis-à-vis natives is attributed to structural changes within the industrial sector as well as to the changing composition of immigrants to Sweden. Before the mid 1970's immigration was characterized by labor market immigration from primarily European and Nordic countries geared toward the expanding industrial sector. After the mid 1970's, immigration shifted to political immigration from primarily non-European countries. It is argued that these later immigrants experienced greater difficulties in entering the Swedish labor market due to increased geographic/cultural distance to natives and due to a structural shift towards more skill-intensive employment opportunities for which immigrants, on average, are less qualified for (Ekberg, 1991, 1994; Ekberg & Gustafsson, 1995; Edin *et al.*, 2000; Edin & Åslund, 2001; Scott, 1999; Rosholm *et al.*, 2000). Other studies downplay the *cultural distance* school of thought, pointing instead to discriminatory hiring/firing practices in conjunction with tighter labor market conditions (Arai, Regner & Schröder, 2000; Arai, Schröder & Vilhelmsson, 2000; Arai & Vilhelmsson, 2001, de los Reyes, 1998).

Various studies on employment convergence of immigrants to natives in Sweden yield results that region of origin has a negative differential impact on employment rates and that duration of residence has a generally positive effect on employment levels (Arai, Regner & Schröder, 2000; Ekberg, 1991, 1994). These studies do not analyse specifically if employment convergence patterns differ between immigrant groups. Other studies come to diverging results concerning the impact of duration of residence on employment probabilities. Rosholm *et al.*, (2000) analyse immigrant men from four different countries and find that the increased duration of residence leads to increasing employment opportunities in the mid-1980s and *decreasing* employment opportunities in the mid-1990s.² Bevelander & Nielsen (1999, 2001), comparing two cross-sections, 1970 and 1990, using a very flexible model specification, conclude that for the 1990 cross-section, male immigrants have improved employment chances with

¹ This percentage based on immigrants with non-Swedish citizenship.

² This study uses a continuous measure of duration of residence and extrapolates convergence profiles based on an individual with given characteristics.

increased residency while female immigrants fully converge to and surpass native women after 15 years. This study aims to resolve the disparity concerning the impact of duration of residence on employment probabilities in Sweden as well as to analyse potentially different employment convergence patterns between immigrant groups.

3. Data and empirical set-up

The data, provided by the Trade Union Institute for Economic Research (FIEF), is a longitudinal dataset with yearly information from 1990-2000 on more than 200,000 individuals of which approximately 19,000 were born abroad. Originally stemming from LOUISE, a longitudinal database containing information on personal and demographic variables, education, income and employment status, this random sample has by FIEF been matched with the National Labor Market Board's Event Database (AMS HÄNDEL), containing detailed information on unemployment status and duration.

This study aims to examine employment convergence over time by estimating the impact of duration of residence on employment, controlling for personal and demographic characteristics. Estimations are presented, separately by gender, for immigrants only, natives only, pooled immigrants and natives and separately by region of origin. Although other measures of assimilation are used in the literature, for example, comparison of different cohorts of immigrants from the same region (see Lalonde & Topel, 1992), this study focuses on employment disparities between immigrants and natives, departing from the following basic specification:

$$y_{it} = \alpha_i + DUR'_{it} \beta_1 + X'_{it} \beta_2 + \varepsilon_{it} \quad (1)$$

$$\varepsilon_{it} = \mu_i + \mu_t + \varphi_{it} \quad (2)$$

where y_{it} is a dichotomous dependent variable indicating whether individual i is employed in period t , DUR is a series of dummy variables indicating duration of residence in Sweden for immigrants and X_{it} is a vector of human capital variables included in estimation. These are region of origin, age at immigration, age, education, a dummy variable indicating if the individual has children under the age of three and marital status.³

³ See Appendix for description of variables used in estimation.

Initially, logit models are estimated controlling for time effects.⁴ In order to use the available panel dimension, random effect models are also estimated accounting for potential cohort effects as well as time-invariant individual effects.

The dichotomous dependent variable for employment is based on both income and event registers. An individual i is coded as *regularly employed* if, during the given year, he or she registers income from gainful or self-employment and is *not* found in any other event category indicating participation in labor market programs or registration as unemployed or out of the labor force. As such, the employment variable focuses on those who are regularly employed only during a given year. Sample statistics indicate that 41 percent of immigrant men are regularly employed and 39 percent of immigrant women during the 1990-2000 period. These means vary by region of origin. In comparison 73 percent of native men and 69 percent of native women are coded as regularly employed during the period. Two other measures of employment are tested, *primarily employed* is a broader measure of employment based on the same income and event registers as above but allowing for combinations of employment with other labor market conditions during the given year. The other, *employment (Nov.)*,⁵ measures employment status in November of each year. See sample means in Appendix for the mean employment levels generated by the different measures.

The main explanatory variable of interest, *duration of residence*, measures the number of years an individual has lived in Sweden since migration and is coded into five, five-year categorical variables. This variable is generated from information on year of immigration, which is available in the data from 1946 onwards. 10,428 observations for year of immigration are coded as missing and dropped from estimation. This corresponds to approximately 4 percent of the immigrant sample. In addition, 1,452 observations are re-coded as natives as the individuals in question register being born abroad, but with native parents.

Year of immigration measures year of *latest* immigration and as such underestimates the number of years in the host country for frequent migrants. This is likely to be especially true for Nordic immigrants who due to long-standing labor market agreements between the Nordic countries are free to move and take employment within Scandinavia. To minimise

⁴ OLS and probit models are also estimated as a check of sensitivity of results to varying assumptions about the distribution of the error term as well as linearity.

⁵ Based on Statistics Sweden November analysis (Årsyss).

this bias those individuals indicating frequent migration are dropped from estimation.⁶

In order to assess the impact of region of origin on employment convergence patterns, immigrants are sorted into four regional categories based on country of birth: *Nordic*, *West European*, *East European* and *non-European*. The Nordic category consists of Denmark, Finland, Iceland and Norway. Western and southern European countries are classified as West European. The former East Block countries (Albania, Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Moldavia, Poland, Romania, Russia, Slovakia, Ukraine and White Russia) as well as the republics of former Yugoslavia are classified as East European. Remaining countries are placed in the non-European group. Note that Turkey is classified as Asian and therefore falls into the non-European group. This broad classification may hide within-group heterogeneity. However, significant and large differences between groups would indicate that within-group heterogeneity is small or that those nationalities, within each group, showing deviating patterns are small in number, and therefore relatively unimportant. The sensitivity of results to the exclusion of North America and Australia from the non-European group is tested. In addition, categorization by OECD-status is also tested.

The sample used for estimation is based on individuals aged 25-65, except where explicitly stated otherwise. This is done in order to diminish the potentially negative bias on employment probabilities due to higher school enrolment and greater mobility in and out of regular employment among the young.⁷

Sample statistics, reported in Table A1 of the Appendix, indicate that natives have the highest average employment rates for both men and women and non-Europeans the lowest, regardless of employment measure used. There is less variation in mean labor force participation between immigrant groups indicating between-group variation in unemployment levels. Non-Europeans are, on average, younger and with fewer years residence in Sweden. In terms of education, Nordic men stand out by having relatively small percentages with completed university degrees while non-European men have a relatively large percentage with completed

⁶ Frequent migrants are those indicating a year of emigration prior to year of immigration. 73,011 observations are dropped for this reason.

⁷ This implies that approximately 2.6 percent of the original native sample (66,284 observations) is dropped as well as 2.3 percent of the immigrant sample (497,857 observations).

university degrees. Finally, a relatively high percentage of non-Europeans have children under the age of three.⁸

Before turning to the estimation results, one should note that the 1990's were an exceptional period in the recent economic history of Sweden in that unemployment rates reached unprecedented high levels during the middle of this decade. Beginning with a low open unemployment rate of 1.5 percent in 1990, unemployment rates increased to a high of 9.9 percent in 1997 before beginning to decline again to a level of 5.9 percent in 2000.⁹ This study aims to primarily analyse relative differences to natives implying that negative effects on immigrant employment probabilities stand in relation to the negative economic effects on native employment probabilities. It is possible that the economic depression of this period hit immigrants harder than natives and that this effect is heterogeneous between immigrant groups of different origin.

Figure 1 and 2 show cross-section logit estimates for each year separately from 1990 to 2000. The probability of being employed is estimated for each immigrant group, separately by gender, controlling for educational level, age, children and marital status. These figures show the odds of being regularly employed on average for immigrant groups in comparison to natives, i.e., without categorization of immigrants by duration of residence. Some yearly fluctuation in employment chances relative to natives is noted but fluctuations are in general small. Non-European immigrants in particular show relatively constant lower odds of being employed; approximately 80 lower than comparable natives for each year observed, including the years prior to the economic recession. This indicates that although the estimates of duration of residence reported below for more recent immigrant cohorts are likely to be negatively affected by the economic recession post 1990, coefficients for longer duration levels for especially non-Europeans are robust to the economic fluctuations during the estimation period.¹⁰

⁸ Age weighted means indicate a slightly smaller percentage with children under the age of three for non-Europeans, 21 percent for both men and women.

⁹ Information on unemployment, measured as proportion of the working age population, from OECD statistics.

¹⁰ The increased gap to natives for East European immigrants between 1993 and 1994 is a likely consequence of the large inflow of immigrants from former Yugoslavia during these two years. 37 percent of the total sample East European immigrants arrived in 1993-1994 (75 percent of immigrants from Bosnia-Herzegovina).

Figure 1 & 2: Odds Ratio for Probability of Being Employed. Cross-Section Logit Estimation, 1990-2000.¹¹

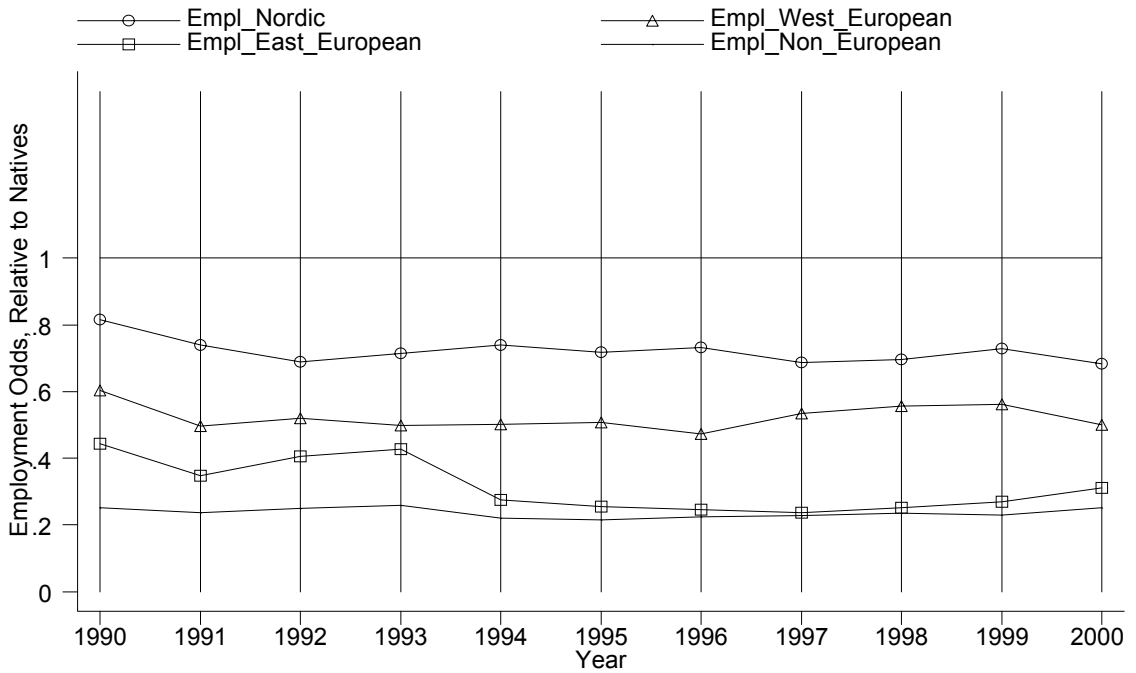


Fig. 1 Employment Odds, Male Immigrants

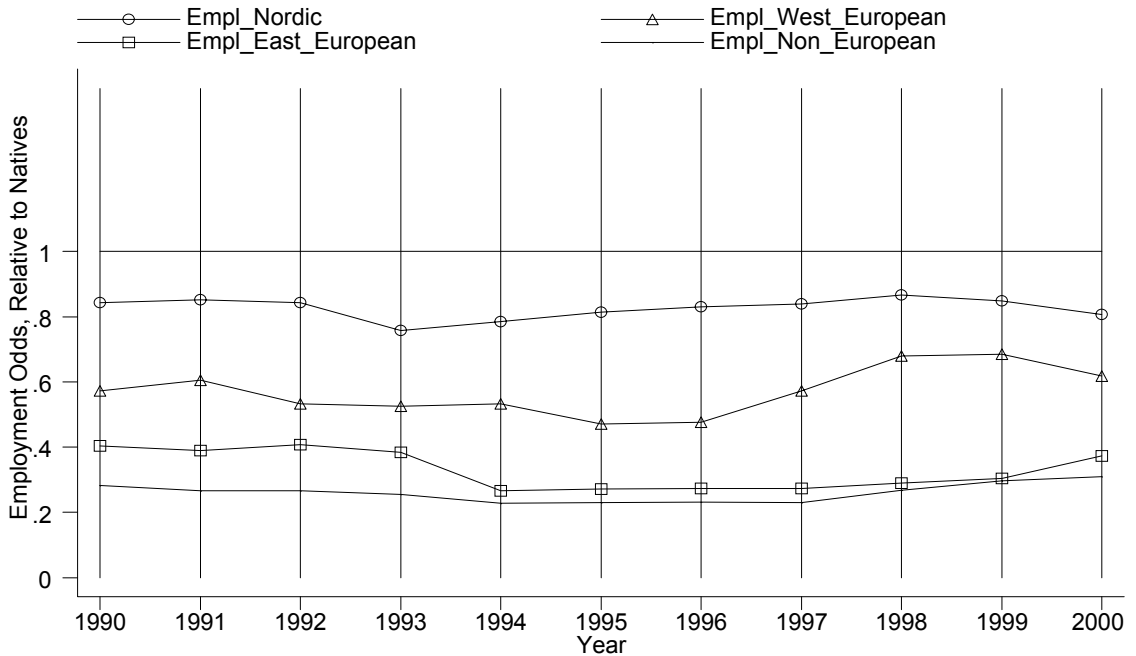


Fig. 2 Employment Odds, Female Immigrants

¹¹ Cross-section estimates by year controlling for age, educational level, children and marital status. Figure shows odds of being employed, on average, for each immigrant group relative natives.

4. Empirical results

Tables 1 and 2 show results from logit estimation of the employment equation for men and women respectively. Reported with the estimated logit coefficients are the marginal effects evaluated at the means of the independent variables (in bold).¹² Model 1 shows estimation results for natives only, model 2 for immigrants only, including region of origin as a control variable, and model 3 shows estimation of natives and immigrants pooled.

Table 1: Determinants of Employment for Immigrant and Native Men, Aged 25-64, Sweden, 1990-1997. Logit Estimation.

Marginal effects, evaluated at mean of explanatory variables, in bold (where significant).

	Natives (1)	Immigrants (2)	Natives and Immigrants (3)
Region of Origin:			
Nordic	--	--	--
W. European	--	-0.127* (0.034) -0.032	--
E. European	--	-0.518* (0.028) -0.129	--
Non-European	--	-0.897* (0.025) -0.223	--
Duration of Residence:			
1-5 years	--	-1.232* (0.030) -0.305	-2.259* (0.021) -0.442
6-10 years	--	-0.476* (0.026) -0.118	-1.615* (0.017) -0.316
11-15 years	--	--	-1.165* (0.020) -0.228
16-20 years	--	0.208* (0.029) 0.052	-0.891* (0.022) -0.174
21-25 years	--	0.185* (0.030) 0.046	-0.739* (0.021) -0.145
Education:			
Primary school	--	--	--

¹² The marginal effect for dummy variables calculates the discrete change as the dummy variable changes from 0 to 1.

Secondary school	0.417* (0.006) 0.075	0.253* (0.023) 0.063	0.407* (0.006) 0.079
University (under graduate)	0.871* (0.008) 0.138	0.511* (0.023) 0.127	0.827* (0.007) 0.145
Graduate	1.947* (0.047) 0.197	1.198* (0.073) 0.279	1.753* (0.037) 0.210
Age:			
16-35	--	--	--
36-45	0.519* (0.007) 0.093	-0.032 (0.023) -0.008	0.471* (0.007) 0.092
46-55	0.584* (0.008) 0.105	-0.142* (0.030) -0.035	0.535* (0.007) 0.105
56-64	-0.380* (0.009) -0.068	-0.966* (0.046) -0.240	-0.608* (0.008) -0.119
Age at immigration ¹	--	-0.320 (0.033) -0.079	0.002 (0.027) 0.0002
Child ²	0.493* (0.009) 0.089	0.134* (0.024) 0.033	0.433* (0.008) 0.085
Married	0.724* (0.006) 0.131	0.551* (0.018) 0.137	0.681* (0.005) 0.133
Year:			
1990	--	--	--
1991	-0.258* (0.016) -0.046	-0.333* (0.043) -0.083	-0.265* (0.014) -0.052
1992	-0.731* (0.015) -0.132	-0.796* (0.042) -0.198	-0.709* (0.013) -0.139
1993	-0.962* (0.015) -0.173	-0.984* (0.042) -0.244	-0.921* (0.013) -0.180
1994	-1.067* (0.015) -0.192	-1.136* (0.042) -0.282	-1.016* (0.013) -0.199
1995	-0.999* (0.015) -0.180	-1.146* (0.042) -0.285	-0.942* (0.013) -0.184
1996	-0.978* (0.015) -0.176	-1.140* (0.042) -0.283	-0.897* (0.013) -0.175
1997	-1.003* (0.015) -0.181	-1.155* (0.042) -0.287	-0.904* (0.013) -0.177
1998	-0.954 (0.015) -0.172	-1.083* (0.042) -0.269	-0.855* (0.013) -0.167

1999	-0.891 (0.015)	-1.041* (0.042)	-0.793* (0.013)
	-0.161	-0.259	-0.155
2000	-0.845 (0.015)	-0.934* (0.042)	-0.755* (0.013)
	-0.152	-0.232	-0.148
Constant	0.875* (0.013)	1.195* (0.045)	0.876* (0.012)
Log Likelihood	-425512	-39721	-489262
LR chi2 (18) (26) (24) ³	74328	9727*	109342*
N	806,852	64,560	901,632

Note: *denotes significance at one percent level and ** at five percent level.

¹Age at Immigration is a dichotomous variable equal to one if age at immigration (defined as year of immigration - year of birth) is less than 19 years, zero otherwise.

²Child is a dichotomous variable equal to one if individual has children under the age of three, zero otherwise.

³Likelihood ratio test, testing significance of model. Degrees of freedom for respective model specification noted in parenthesis.

Estimation on immigrants only yields results indicating that duration of residence has a significant impact on employment ratios up to and including 25 years of residence in Sweden. Controlling for region of birth, human capital differences and time effects, male immigrants with 1-5 years in Sweden have an employment ratio 31 percentage points lower than immigrants with 11-15 years of residence while immigrants with 21-25 years residency have a significant 5 percentage point higher employment ratio. Results for female immigrants are similar, with 31 percentage points lower for the 1-5 year category and 3 percentage points higher for the 21-25 year category. Region of origin has a differential impact on employment probabilities where West and East European male immigrants, in comparison to Nordic men, have significantly lower employment ratios by 3 and 13 percentage points respectively (4 and 15 percentage points for female immigrants). Non-European male immigrants indicate a larger gap to Nordic immigrants with an employment ratio that is 22 percentage points (23 for female immigrants) lower.¹³

In comparison to natives (model 3), estimates indicate that immigrant men with 1-5 years in Sweden have employment ratios that are 44 percentage points (48 for female immigrants) lower. Longer duration of

¹³ The sensitivity of results for the non-European category to the exclusion of North American countries and Australia was tested yielding no appreciable change in reported results. In addition, categorization by OECD status was also tested (Nordic countries excluded from the OECD category). Results indicate that in comparison to Nordic men, male immigrants from OECD countries have an employment ratio that is 8 percentage points lower and non-OECD men 21 percentage points lower (12 and 21 percentage points, respectively, for female immigrants relative to native women). The results for duration of residence are qualitatively the same as those reported above.

residence monotonically decreases the gap to natives but immigrants with 21-25 years in Sweden continue to show employment ratios that are a significant 15 percentage points (15 for female immigrants) lower than comparable native men (women). Previous studies on the U.S. labor market show a diminishing marginal impact of duration of residence in the host country disappearing completely after ten years (Chiswick *et al.*, 1997; Schoeni, 1998). This study, using a similar model specification, indicates that duration of residence has a significant impact up to and including 25 years of residence in Sweden. These results are robust to estimation based on two alternative measures of employment.¹⁴ The model was also re-estimated for 1990 only, i.e., before the recession hit Sweden, yielding similar results. Immigrants with over twenty years residency had an employment ratio 12 percentage points lower than natives in 1990.

The age, education, child and marital status variables yield expected results although there are notable differences between immigrants and natives. Employment chances are generally positively associated with age but taper off for the oldest age group (56-64), presumably due to the effect of early retirement. Note that within-immigrant estimation indicates no positive age effects for male immigrants.¹⁵ The positive age effects are stronger for natives than immigrants, as well as for females than males. In a similar manner, the decline for the final age group is weaker for natives and women. Similarly, higher educational levels generally improve individuals' chances of being regularly employed. Female immigrants experience a more positive remuneration for education at all education levels than native women while the remuneration for a university education is stronger for both immigrant men and women. Having children under the age of three is positively correlated to employment chances for men in general as well as for native women, although the effect is smaller for women (negative for immigrant women). This result may be unexpected for women, previous studies on female labour supply indicate that labour force participation is affected negatively primarily for women with pre-school age children only (Arrufat & Zabalza, 1986; Blundell, Duncan & Meghir, 1998). That native

¹⁴ Using the broader definition of employment, *primarily* employed, yields results indicating that in estimation on immigrants only, duration of residence for female immigrants ceases to be significant for employment probabilities after twenty years residency. Results for the two alternative employment measures are otherwise qualitatively the same as those reported above. See Appendix for description of employment measures used in estimation. OLS and probit models were also estimated yielding similar results.

¹⁵ The age effect on estimation of male immigrants only, yield results indicating a negative and significant effect for the 46-55 age group, where the reference group is the 16-35 age group.

women in Sweden do not show a negative effect on employment probabilities for small children is perhaps a consequence of the extensive and subsidized childcare available. Marital status is positively associated with regular employment, an effect that is generally stronger for men. The general time effects also differ between natives and immigrants indicating that the economic downturn of the early 1990's appears to have hit immigrants harder than natives.

Table 2: Determinants of Employment for Immigrant and Native Women, Aged 25-64, Sweden, 1990-1997. Logit Estimation.

Marginal effects evaluated at mean of explanatory variables in bold (where significant).

	Natives (1)	Immigrants (2)	Natives and Immigrants (3)
Region of Origin:			
Nordic	--	--	--
W. European	--	-0.168* (0.038)	--
		-0.041	
E. European	--	-0.605* (0.025)	--
		-0.147	
Non-European	--	-0.935* (0.024)	--
		-0.227	
Duration of Residence:			
1-5 years	--	-1.259* (0.032)	-2.225* (0.023)
		-0.305	-0.478
6-10 years	--	-0.424* (0.027)	-1.457* (0.018)
		-0.103	-0.313
11-15 years	--	--	-1.002* (0.019)
			-0.215
16-20 years	--	0.198* (0.029)	-0.754* (0.021)
		0.048	-0.162
21-25 years	--	0.118* (0.030)	-0.716* (0.020)
		0.029	-0.153
Education:			
Primary school	--	--	--
Secondary school	0.560* (0.006)	0.534* (0.021)	0.568* (0.006)
	0.117	0.130	0.120
University (under graduate)	0.989* (0.007)	1.030* (0.024)	0.998* (0.007)
	0.178	0.252	0.193
Graduate	1.802* (0.074)	1.635* (0.111)	1.695* (0.058)

	0.220	0.371	0.236
Age:			
16-35	--	--	--
36-45	0.582* (0.007)	0.212* (0.024)	0.565* (0.007)
46-55	0.117 0.736* (0.008)	0.051 0.070** (0.031)	0.121 0.702* (0.008)
56-64	0.148 -0.084* (0.009)	0.017 -0.838* (0.048)	0.151 -0.306* (0.008)
Age at immigration ¹	-0.017 --	-0.203 -0.088* (0.034)	-0.066 0.148* (0.026)
Child ²	0.136* (0.008)	-0.040 (0.025)	0.121* (0.008)
Married	0.028 0.451* (0.005)	-0.010 0.269* (0.018)	0.026 0.424* (0.005)
	0.091	0.065	0.091
Year:			
1990	--	--	--
1991	-0.145* (0.015)	-0.226* (0.043)	-0.160* (0.013)
1992	-0.029 -0.353* (0.014)	-0.054 -0.453* (0.042)	-0.034 -0.366* (0.012)
1993	-0.071 -0.528* (0.014)	-0.110 -0.693* (0.042)	-0.079 -0.532* (0.012)
1994	-0.107 -0.654* (0.014)	-0.168 -0.879* (0.042)	-0.114 -0.649* (0.012)
1995	-0.132 -0.677* (0.014)	-0.213 -0.954* (0.042)	-0.139 -0.661* (0.012)
1996	-0.136 -0.728* (0.013)	-0.231 -1.1010* (0.043)	-0.142 -0.684* (0.012)
1997	-0.147 -0.801* (0.013)	-0.245 -1.049* (0.043)	-0.147 -0.738* (0.012)
1998	-0.162 -0.836* (0.013)	-0.255 -1.005* (0.043)	-0.159 -0.768* (0.012)
1999	-0.169 -0.801* (0.013)	-0.244 -0.917* (0.042)	-0.165 -0.729* (0.012)
2000	-0.162 -0.774* (0.013)	-0.222 -0.843* (0.042)	-0.157 -0.711* (0.012)
Constant	-0.156 0.380*	-0.204 0.617*	-0.153 0.374*

	(0.012)	(0.045)	(0.011)
Log Likelihood	-440631	-38070	-503847
LR chi2 (18) (26) (24) ³	59398*	12529*	96512*
N	774,106	64,878	871,740

Note: *denotes significance at 1 percent level and ** at 5 percent level.

¹Age at Immigration is a dichotomous variable equal to one if age at immigration (defined as year of immigration - year of birth) is less than 19 years, zero otherwise.

²Child is a dichotomous variable equal to one if individual has children under the age of three, zero otherwise.

³Likelihood ratio test, testing significance of model. Degrees of freedom for respective model specification noted in parenthesis.

Estimation comparing the effect of duration of residence for immigrants' vis-à-vis natives (model 3 in Table 1 and 2) is based on the assumption that the human capital and time effects are similar between natives and immigrants.¹⁶ The separate estimates above for immigrants and natives indicate that this is not generally the case. In order to assess the effect of duration of residence on employment probabilities while allowing for heterogeneity in the explanatory variables, a full interaction model is estimated.¹⁷ Results indicate that differences to natives are no longer significant after 15 years for male immigrants vis-à-vis native men and after twenty years for female immigrants vis-à-vis native females. This implies that differences to natives, in terms of employment, for immigrants with 15-20 years residency in Sweden, are explained by heterogeneous human capital and time effects and no longer by the duration of residence variable. It does not, however, a priori imply full employment convergence to natives for immigrant groups with longer residency.

The full interaction specification also raises the issue of explaining why immigrants and natives are remunerated differently for human capital and time effects. An inability to evaluate foreign degrees or less applicable, to the Swedish labor market, foreign education is one such explanation. Results are however robust to estimation on a sub-sample of immigrants who have attained their highest educational degree in Sweden.¹⁸ In

¹⁶ There may be heterogeneity in human capital and time effects between immigrant groups stemming from different regions as well. A full interaction model on immigrants only, relaxing the assumption of homogeneity between immigrant groups does not alter the results for duration of residence.

¹⁷ See Table A2 in Appendix for results.

¹⁸ Estimation based on information on year of completion of highest attained degree and year of immigration. Results for men indicate a greater employment gap to natives for the sub-sample of immigrants with their final degree attained in Sweden. Results should, however, be interpreted with care as information on year of completion of highest attained degree is not available in many of the registers used to generate this variable.

addition, the employment variable does not measure *qualified* employment for which educational quality differences are potentially more important but employment *of any kind* for which differences in education between immigrants and natives may be less relevant. Another prevalent hypothesis concerns the changing organizational structure in Sweden towards more flexible organizations. It is argued that this change has increased the importance of informal and local specific knowledge putting immigrants in general, and non-European immigrants in particular, at a disadvantage. As broad measures of employment are used in estimation, such organizational changes must be widely spread across all sectors of the economy in order to explain persistent differences between immigrants and natives. Initial difficulties in securing employment can have lock-in effects leading to lower average levels of experience, seniority and on-the-job training which may continue to influence employment probabilities over time. Other potential explanations include lower average health status among immigrant groups, a scarring effect due to for example, high unemployment at the time of immigration and discrimination, either in the form of statistical discrimination or in preferences for discrimination.

The estimated coefficients in Table 1 and 2 may also be showing a cohort effect rather than an assimilation effect. If the composition of immigrants changes over time, cohort quality differences between early immigrants and later immigrants may explain the results for duration of residence. As noted earlier, this question is of particular relevance to the Swedish labor market where, before the mid 1970's, immigration was composed of labor migrants from other European countries while after this period, political immigrants from non-European countries dominate. Beyond potential composition effects over time, controlling for unobserved individual heterogeneity is important when region of origin groups are broad and heterogeneous. Random effect models are therefore estimated to control for these effects on employment probabilities.¹⁹ In estimation on immigrants only, results for duration of residence are robust to random effects estimation. The negative marginal effect attributable to region of origin, however, increases for East and non-European men in comparison to Nordic men while the coefficient for West European men is no longer significant. For female immigrants, the negative marginal effect of region of origin increases for respective immigrant group. In comparison to natives, random effects estimates yield results indicating a larger

¹⁹ Results from random effect logit estimation on duration of residence are shown in Table A3. Results are robust to estimation by random effects GLS and probit models, available from author by request.

employment gap to natives. After 20 years, immigrants have employment ratios significantly lower than natives by 20-24 percentage points.

Random effects estimation however, is not free from biases stemming from violation of the assumption of no correlation between explanatory variables and the time-invariant individual effects, as well as the assumption of independence between the random error term and individual error term.²⁰ A likelihood ratio test, after random effects logit estimation, indicates that the individual effects are important.²¹ Normally this would point to fixed effects as the preferred estimation technique. However, fixed effects estimation would drop individuals with no variation in employment, i.e., all individuals either employed or unemployed during the entire period of observation. This implies that employment probabilities would be estimated conditional on an observation of at least one period of employment for each individual, thereby estimating the impact of duration of residence for those indicating employment at least one, but not all years under observation. Fixed effects estimation would therefore address a different question than the one being examined here, based on a select sample of individuals. Random effects models are nonetheless estimated as a sensitivity analysis of results.²²

In short, the results indicate that employment convergence between immigrants and natives occurs during the first 20-25 years of residence, assuming homogeneity in human capital and time effects. The full interaction model shows that differences between natives and immigrants are no longer significant for immigrants with 15-20 years residency contingent on heterogeneous human capital and time effects. The results also confirm that region of origin has a differential negative impact on employment ratios, as seen in estimation on immigrants only. In comparison to Nordic immigrants, West Europeans, East Europeans and non-Europeans show significantly lower employment ratios, in that order.²³

²⁰ For random effect GLS estimation, this is confirmed by the Hausman specification test indicating that under the assumption that the model is correctly specified there is correlation between the explanatory variables and the individual error term.

²¹ This is confirmed by the Breusch-Pagan Lagrange multiplier test for random effects after random effects GLS estimation, testing if $\text{var}(\mu_i) = 0$.

²² Maddala, 1987 states that ignoring the error correlations and using a standard probit model with pooled data, instead of a random effects probit model, yields consistent, though inefficient estimates. Reported results were robust to probit estimation.

²³ Similar regressions were run estimating labor force participation. Results indicate that convergence to natives occurs only during the first 5-10 years of residence after which there is a significant and constant labor force participation gap to natives of 10-12 percentage points. Region of origin has a differential impact on this probability but with less variation than in the employment estimates.

Gender differences among immigrants in employment convergence patterns are small indicating no support for Baker and Benjamin's (1997) family investment hypothesis or any indication of larger disparities in norms concerning the trade off between home and market labor between immigrant and native women than between their male counterparts.

Two other potential biases in estimation need to be considered. The first concerns a potential emigration bias on the reported results. The duration of residence variable is generated from information on year of *latest* immigration. As such the duration variable will understate actual years of residence for frequent migrants. This problem is particularly relevant to Nordic immigrants who, due to labor market agreements between Nordic countries, can freely migrate to and work within any of these countries.²⁴ In addition, a positive emigration bias would result if the immigrants, who chose to emigrate from Sweden within a short period of time of immigration, were a positive selection of workers in terms of employment rates. Previous research has highlighted the potential biases of immigrant emigration on assimilation coefficients (Borjas & Bratsberg, 1996; and for the Swedish labor market, Edin *et al.*, 2000). If there are systematic differences, in terms of employment probabilities, among immigrants who subsequently emigrate from Sweden, employment convergence during the first five to ten years may be over/under estimated. In order to meet this problem, the basic logit model is re-estimated excluding individuals who indicate a year of emigration. Results reported in Table A4 of the Appendix show that estimates for duration of residence are robust to potential emigration biases. West European men however no longer significantly differ from Nordic men in terms of employment probabilities.

The second issue concerns the possibility that results for the early duration of residence category are negatively biased due to a greater propensity for immigrants to be enrolled in school in order to improve local language skills or to have foreign degrees re-accredited or updated with local degree requirements. A similar concern is that immigrants differ from natives in terms of early retirement percentages. The data indicate that during the 1990-2000 period, 10 percent of natives, over the age of 24, are registered as out of the labor force, due to either school enrolment, early retirement, military service or for unspecified reasons, compared to 14 percent of Nordic immigrants, 21 percent of West Europeans and 26 percent of East and non-Europeans respectively. These differences may bias estimates of the employment gap between immigrants and natives.²⁵

²⁴ Individuals indicating frequent migration have already been dropped from estimation.

²⁵ It is not obvious that early retirement should be considered exogenous to employment probabilities as many of the long term unemployed may, due to the benefit system in

As such, the basic logit model was again re-estimated using the full age distribution (16-64) but excluding individuals registered as out of the labor force for any of the above-specified reasons.²⁶ Results indicate a smaller employment gap to natives but a significant difference up to and including immigrants with 25 years residency.²⁷

In order to ascertain if employment convergence to natives differs by region of birth and by gender, separate regressions are run for each of these groups. Logit estimation results, shown in Table 3, separately for men and women, compare immigrants born in a given region to natives. As before, the probability of being regularly employed is estimated controlling for duration of residence, age, age at immigration, education, the presence of children under the age of three and marital status. Only the results for duration of residence are shown.²⁸ Duration of residence is found to have a differential impact on employment across immigrant groups from different regions and small differences by gender. Nordic and West European men have small changes in coefficients between duration of residence levels and do not have monotonically improved employment probabilities with longer duration of residence. East European and non-European men however show improved employment chances, relative to natives, for each level of duration of residence. For the female sample, Nordic women show improved employment chances for the first 20 years residency and East European women for the first 15 years while West European women show no clear pattern by duration of residence. Finally, non-European women indicate a clear pattern of improved employment chances with increased duration of residence.²⁹

Testing whether coefficients for each level of duration of residence significantly differ from the previous level confirms this picture. Nordic and West European men have primarily insignificant changes between duration of residence levels while East and non-European men show a pattern of significant improvement for each duration of residence category. For women duration of residence significantly improves employment chan-

Sweden, prefer to be registered as prematurely retired. In addition, long-term unemployment may have negative health repercussions leading to early retirement from the labor force.

²⁶ Results are also robust to estimation of the basic logit model specification on a sample aged 25-60, i.e., dropping individuals entering into potential retirement age.

²⁷ See Table A5 in the Appendix.

²⁸ Results for control variables are available from author, by request

²⁹ The sensitivity of results for the non-European region of origin category to the exclusion of North American countries and Australia was tested for both men and women, yielding no notable changes in reported results.

Table 3: Determinants of Employment in Estimation on Natives and Immigrants, by Region of Origin and Gender, Aged 25-64, Sweden, 1990-1997. Logit Estimation.

Marginal effects evaluated at mean of explanatory variables in bold (where significant).

	Nordic	W. European	E. European	Non-European
Men				
Duration of Residence:				
1-5 years	-0.606* (0.062)	-1.062* (0.070)	-2.521* (0.043)	-2.679* (0.028)
	-0.110	-0.192	-0.459	-0.503
6-10 years	-0.644* (0.055)	-0.829* (0.067)	-1.278* (0.042)	-1.949* (0.022)
	-0.117	-0.150	-0.233	-0.366
11-15 years	-0.552* (0.053)	-0.716* (0.065)	-1.052* (0.050)	-1.423* (0.025)
	-0.100	-0.129	-0.192	-0.267
16-20 years	-0.397* (0.043)	-0.681* (0.062)	-0.993* (0.052)	-1.196* (0.033)
	-0.072	-0.123	-0.181	-0.224
20-25 years	-0.375* (0.034)	-0.701* (0.058)	-0.884* (0.043)	-1.069* (0.043)
	-0.068	-0.127	-0.161	-0.201
Human Capital	Yes	Yes	Yes	Yes
Year Controls	Yes	Yes	Yes	Yes
Log Likelihood	-433594	-429170	-432985	-446369
LR chi2 (24)	75981*	75715*	79859*	95776*
N	819,775	812,880	818,955	840,358
Women				
Duration of Residence:				
1-5 years	-0.706* (0.065)	-0.899* (0.089)	-2.471* (0.041)	-2.597* (0.034)
	-0.143	-0.182	-0.505	-0.538
6-10 years	-0.564* (0.052)	-0.632* (0.078)	-1.225* (0.035)	-1.839* (0.025)
	-0.114	-0.128	-0.250	-0.382
11-15 years	-0.381* (0.044)	-0.873* (0.075)	-0.903* (0.040)	-1.305* (0.028)
	-0.077	-0.176	-0.184	-0.271
16-20 years	-0.338* (0.036)	-0.550* (0.073)	-0.983* (0.041)	-1.003* (0.036)
	-0.068	-0.111	-0.201	-0.208
20-25 years	-0.378* (0.029)	-0.695* (0.067)	-1.085* (0.038)	-0.966* (0.048)
	-0.076	-0.140	-0.221	-0.201
Human Capital	Yes	Yes	Yes	Yes
Year Controls	Yes	Yes	Yes	Yes
Log Likelihood	-450728	-443214	-450640	-456163
LR chi2 (24)	60842*	60161*	67617*	81206*
N	790,299	778,165	790,721	802,117

Note: * denotes significance at 1 percent level, ** at 5 percent level with respect to reference category natives. Human capital controls include education, age, age at immigration, children under the age of three and marital status.

ces for the first 15 years for Nordic and East European women and for the first 20 years for non-European women. West European women indicate a significant improvement only for the first 10 years. Notable gender differences are that duration of residence has greater explanatory power for Nordic women than Nordic men while the opposite is true for East Europeans. Employment gaps to natives are largely the same for men and women of a given region with the exception of East European men who show a somewhat smaller gap to native men after 20 years than their female counterparts do to native women.³⁰

5. Conclusions

This study has analyzed the impact of duration of residence on the employment gap between immigrants and natives in the Swedish labor market during the 1990-2000 period. Duration of residence has a significant effect on employment probabilities, in comparison to natives, up to and including the first 20-25 years of residence for all immigrant groups. Estimation of a basic employment equation, assuming homogeneous human capital and time effects, shows that immigrants with 25 years in Sweden continue to have employment ratios that are, on average, 15 percentage points lower than comparable natives, varying by region of origin. Duration of residence has greater explanatory power for East and non-European immigrants than Nordic and West European immigrants as seen by significantly improved employment probabilities with longer residency in Sweden.

These results differ from previously reported results on the US labor market where immigrants reach native employment levels after ten years of residency but experience a persistent wage gap over time in the host country. The Swedish case seems to be diametrically opposed where immigrants experience a persistent employment gap to natives while the wage gap for those immigrants successful in finding employment is small.

Gender differences in employment convergences patterns are small. No differences are found in the basic pooled estimation and only small

³⁰ Random effects estimation by gender and region of origin, shown in Table A6 of the Appendix, largely confirm the results of the logit estimations presented in Table 3. Random effects estimation however yields results indicating greater gender differences within immigrant groups. With the exception of Nordic immigrants, female immigrants show a greater employment gap to native females than male immigrants do to native men.

differences in the final employment gap to natives for immigrants with longer duration of residence in Sweden. There is therefore no support for the family investment hypothesis or for hypothesis concerning a greater disparity in choices between home and market labor between immigrant and native women than between immigrant and native men.

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Appendix:

Table A1: Descriptive Statistics by Region of Origin: Age>24

	Natives	Nordic	West European	East European	Non-European
Men					
Reg. Employed:	0.74	0.55	0.50	0.40	0.34
Primarily Employed:	0.87	0.68	0.62	0.54	0.54
Employed (Årsyss):	0.82	0.63	0.55	0.48	0.45
Labor force participation:	0.91	0.84	0.80	0.77	0.78
Age (1990):	40 (9.4)	39 (8.8)	39 (8.8)	40 (9.1)	35 (7.9)
Age at immigration:	--	30 (13.2)	25 (10.8)	28 (9.3)	30 (10.7)
Years in Sweden (1990):	--	19 (6.3)	17 (6.8)	15 (7.4)	8 (6.0)
Completed Education:					
Primary school:	0.28	0.35	0.22	0.17	0.26
Secondary school:	0.46	0.39	0.33	0.43	0.33
University, undergraduate:	0.24	0.11	0.21	0.19	0.23
Graduate Studies:	0.010	0.006	0.029	0.013	0.016
Child ¹ :	0.13	0.11	0.13	0.13	0.22
Married:	0.52	0.37	0.42	0.52	0.50
Observations	806,852	16,392	7,884	14,892	38,690
Women					
Reg. Employed:	0.70	0.58	0.47	0.36	0.27
Primarily Employed:	0.86	0.75	0.60	0.52	0.47
Employed (Årsyss):	0.80	0.69	0.53	0.45	0.38
Labor force participation:	0.89	0.85	0.75	0.73	0.69
Age (1990):	41 (9.4)	39 (8.1)	39 (8.9)	39 (8.6)	35 (8.2)
Age at immigration:	--	24 (9.6)	27 (9.8)	30 (10.3)	28 (10.1)
Years in Sweden (1990):	--	17 (6.2)	14 (7.3)	14 (7.4)	7 (5.6)
Completed Education:					
Primary school:	0.25	0.30	0.28	0.22	0.35
Secondary school:	0.46	0.38	0.26	0.37	0.30
University, Undergraduate:	0.28	0.23	0.26	0.24	0.18
Graduate Studies:	0.003	0.002	0.015	0.006	0.007
Child ¹ :	0.14	0.15	0.13	0.13	0.24
Married:	0.56	0.46	0.54	0.54	0.56
Observations	774,106	19,046	5,169	19,786	32,079

Note: Standard deviation in parenthesis.

¹ Percentage of population with children under the age of three.

Table A2: Determinants of Employment in Estimation on Natives and Immigrants, Aged 25-64, Sweden. Full Interaction Model.

Marginal effects evaluated at mean of explanatory variables in bold (where significant).

	Men	Women
	Logit Pooled (1)	Logit Pooled (2)
Duration of Residence:		
1-5 years	-1.576* (0.037)	-1.849* (0.039)
	-0.370	-0.431
6-10 years	-0.842* (0.037)	-1.004* (0.037)
	-0.190	-0.241
11-15 years	-0.331* (0.039)	-0.511* (0.039)
	-0.069	-0.118
16-20 years	-0.011 (0.041)	-0.172* (0.041)
	-0.002	-0.038
21-25 years	0.106* (0.041)	-0.110* (0.041)
	0.021	0.024
Human Capital	Yes	Yes
Year Dummies	Yes	Yes
Interactions (Immigrant) with all explanatory variables	Yes	Yes
Log Likelihood	-488330	-503405
LR chi2 (42)	111208*	97396*
N	901,632	871,740

Note: * denotes significance at 1 percent level. Human capital controls include education, age, age at immigration, children under the age of three and marital status. Full interaction model implies that all explanatory variables were interacted with a dummy variable indicating immigrant status.

Table A3: Determinants of Employment for Immigrants and Natives, Aged 25-64, Sweden, 1990-1997. Random Effects Estimation.

Marginal effects evaluated at mean of explanatory variables in bold (where significant).

	Men		Women	
	RE Logit Immigrants	RE Logit Pooled	RE Logit Immigrants	RE Logit Pooled
Region of Origin:				
Nordic	--	--	--	--
W. European	-0.120 (0.127)	--	-0.582* (0.159)	--
E. European	-0.029 -1.292* (0.094)	--	-0.127 -1.441* (0.102)	--
Non-European	-0.308 -1.911* (0.083)	--	-0.314 -2.060* (0.092)	--
	-0.456		-0.449	
Duration of Residence:				
1-5 years	-1.744* (0.060)	-3.962* (0.050)	-1.723* (0.063)	-3.754* (0.054)
	-0.416	-0.424	-0.376	-0.590
6-10 years	-0.511* (0.045)	-2.857* (0.046)	-0.452* (0.046)	-2.526* (0.051)
	-0.122	-0.305	-0.098	-0.397
11-15 years	--	-2.398* (0.047)	--	-2.020* (0.053)
		-0.256		-0.317
16-20 years	0.224* (0.051)	-2.131* (0.053)	0.296* (0.050)	-1.697* (0.056)
	0.053	-0.227	0.064	-0.266
21-25 years	0.328 (0.065)	-1.896* (0.057)	0.346* (0.067)	-1.511* (0.059)
	0.078	-0.203	0.075	-0.237
Human Capital Controls	Yes	Yes	Yes	Yes
Year Controls	Yes	Yes	Yes	Yes
Log Likelihood	-28542	-325907	-27840	-348550
Wald chi2 (26)	3718*	--	4070*	--
Wald chi2 (24)	--	43698*	--	34349*
N	64,560	901,632	64,878	871,740
Likelihood Ratio Test ¹	2.2e+04*	3.3e+05*	2.1e+04*	3.1e+05*

Note: * denotes significance at 1 percent level and ** at 5 percent level. Human capital controls include education, age, age at immigration, children under the age of three and marital status

¹Likelihood ratio test testing whether the proportion of the total variance contributed by the panel-level variance component is equal to zero. If so, the panel-level variance component is unimportant and the panel estimator is not different from the logit estimator.

Table A4: Determinants of Employment for Immigrants and Natives, Aged 25-64, Sweden, 1990-1997. Logit Estimation Excluding Emigrants.

Marginal effects evaluated at mean of explanatory variables in bold (where significant).

	Men		Women	
	Logit Immigrants (1)	Logit Pooled (2)	Logit Immigrants (3)	Logit Pooled (4)
Region of Origin:				
Nordic	--	--	--	--
W. European	-0.050 (0.036)	--	-0.116* (0.040)	--
E. European	-0.013 -0.508* (0.029)	--	-0.028 -0.586* (0.026)	--
Non-European	-0.126 -0.881* (0.026)	--	-0.143 -0.917* (0.025)	--
	-0.219		-0.223	
Duration of Residence:				
1-5 years	-1.281* (0.031)	-2.317* (0.021)	-1.296* (0.032)	-2.275* (0.023)
6-10 years	-0.319 -0.482* (0.027)	-0.450 -1.627* (0.018)	-0.315 -0.426* (0.028)	-0.486 -1.470* (0.018)
11-15 years	-0.120 --	-0.316 -1.174* (0.020)	-0.104 --	-0.314 -1.011* (0.020)
16-20 years	-0.216 0.211* (0.030)	-0.228 -0.896* (0.022)	-0.165 0.193* (0.029)	-0.155 -0.771* (0.021)
21-25 years	0.053 0.173* (0.031)	-0.174 -0.766* (0.021)	0.047 0.125* (0.030)	-0.165 -0.727* (0.020)
	0.043	-0.149	0.030	-0.155
Human Capital Controls	Yes	Yes	Yes	Yes
Year Controls	Yes	Yes	Yes	Yes
Log Likelihood	-38359	-481457	-37218	-497330
LR chi2 (26)	9672*	--	12416*	--
LR chi2 (24)	--	106673*	--	93888*
N	62,506	890,836	63,477	862,564

Note: *denotes significance at 1 percent level, ** at 5 percent level and *** at 10 percent level.

Human capital controls include education, age, age at immigration, children under the age of three and marital status.

Table A5: Determinants of Employment for Immigrants and Natives, Aged 18-64, Sweden, 1990-1997. Logit Estimation Excluding Individuals Out of the Labor Force.

Marginal effects evaluated at mean of explanatory variables in bold (where significant).

	Men		Women	
	Logit Immigrants (1)	Logit Pooled (2)	Logit Immigrants (3)	Logit Pooled (4)
Region of Origin:				
Nordic	--	--	--	--
W. European	0.027 (0.038)	--	0.080** (0.043)	--
E. European	-0.007 -0.426* (0.031)	--	0.020 -0.511* (0.027)	--
Non-European	-0.106 -0.879* (0.026)	--	-0.128 -0.866* (0.025)	--
	-0.219		-0.216	
Duration of Residence:				
1-5 years	-1.242* (0.031)	-1.652* (0.021)	-1.017* (0.033)	-1.493* (0.023)
6-10 years	-0.310 -0.565* (0.027)	-0.317 -1.324* (0.018)	-0.254 -0.440* (0.028)	-0.299 -1.139* (0.019)
11-15 years	-0.141 --	-0.254 -0.889* (0.021)	-0.110 --	-0.229 -0.738* (0.021)
16-20 years	-0.170 0.206* (0.030)	-0.170 -0.684* (0.023)	0.056 0.223* (0.030)	-0.114 -0.568* (0.022)
21-25 years	0.051 0.497* (0.032)	-0.131 -0.281* (0.024)	0.056 0.442* (0.032)	-0.114 -0.270* (0.023)
	0.124	-0.054	0.110	-0.054
Human Capital Controls	Yes	Yes	Yes	Yes
Year Controls	Yes	Yes	Yes	Yes
Log Likelihood	-36883	-505768	-34790	-488440
LR chi2 (26)	11808*	--	10782*	--
LR chi2 (24)	--	127379*	--	115955*
N	61,772	949,248	58,016	891,349

Note: *denotes significance at 1 percent level and ** at 5 percent level ***. Human capital controls include education, age, age at immigration, children under the age of three and marital status.

Table A6: Duration of Residence, Pooled Immigrants and Natives, by Region of Origin and Gender, Aged 25-64, Sweden, 1990-1997. Random Effects Logit Estimation.

Marginal effects evaluated at mean of explanatory variables in bold (where significant).

	Nordic	W. European	E. European	Non-European
Men				
Duration of Residence:				
1-5 years	-1.515* (0.158) -0.120	-2.159* (0.155) -0.170	-4.615* (0.100) -0.375	-4.603* (0.064) -0.410
6-10 years	-1.279* (0.152) -0.101	-1.602* (0.146) -0.126	-2.930* (0.098) -0.238	-3.438* (0.058) -0.306
11-15 years	-1.114* (0.144) -0.088	-1.314* (0.149) -0.104	-2.812* (0.118) -0.228	-2.930* (0.062) -0.261
16-20 years	-1.034* (0.125) -0.082	-1.184* (0.155) -0.094	-2.537* (0.121) -0.206	-2.813* (0.079) -0.251
20-25 years	-0.984* (0.108) -0.078	-1.404* (0.159) -0.111	-2.173* (0.120) -0.176	-2.632 (0.098) -0.234
Human Capital	Yes	Yes	Yes	Yes
Year Controls	Yes	Yes	Yes	Yes
Log Likelihood	-286485	-283930	-286587	-296806
Wald chi2 (24)	36225*	35861*	37241*	40294*
N	819,775	812,880	818,955	840,358
Women				
Duration of Residence:				
1-5 years	-1.211* (0.145) -0.151	-1.665* (0.166) -0.207	-4.212* (0.092) -0.542	-4.572* (0.070) -0.623
6-10 years	-1.071* (0.122) -0.134	-1.107* (0.140) -0.138	-2.376* (0.089) -0.306	-3.426* (0.061) -0.467
11-15 years	-0.767* (0.099) -0.096	-1.685* (0.149) -0.210	-2.009* (0.107) -0.259	-2.799* (0.065) -0.381
16-20 years	-0.547* (0.083) -0.068	-1.143* (0.179) -0.142	-2.059* (0.114) -0.265	-2.477* (0.082) -0.337
20-25 years	-0.436* (0.078) -0.054	-1.268* (0.198) -0.158	-2.186* (0.117) -0.282	-2.349* (0.109) -0.320
Human Capital	Yes	Yes	Yes	Yes
Year Controls	Yes	Yes	Yes	Yes
Log Likelihood	-311101	-305947	-311236	-315824
Wald chi2 (24)	26476*	26111*	28384*	30910*
N	790,299	778,165	790,721	802,117

Note: *denotes significance at 1 percent level, ** at 5 percent level and *** at 10 percent level. Human capital controls include education, age, age at immigration, children under the age of eighteen and marital status.

Description of Variables:

Employed:

The measure primarily used in estimation is regularly employed. This measure is based on income and event history data and indicates if an individual registers income from gainful or self-employment and is not found in any other event category indicating participation in labor market programs or registration as unemployed or out of the labor force. Two other measures of employment are tested, primarily employed is a broader measure of employment based on the same income and event registers but allowing for combinations of employment with other labor market conditions during the given year. The other, employment (Nov.), based on Statistics Sweden November analysis (Årsyss), measures employment status in November of each year.

Duration of Residence:

Duration of residence measures the number of years an individual has lived in Sweden since migration and is coded into five, five-year categorical variables. This variable is generated from information on year of immigration, which is available in the data from 1946 onwards. 10,428 observations for year of immigration are coded as missing. Of these observations, 1,452 observations are re-coded as natives as the individuals in question register being born abroad, but have both parents registered as born in Sweden.

Region of Origin:

Four regional categories are generated based on country of birth: Nordic, West European, East European and non-European. The Nordic category consists of Denmark, Finland, Iceland and Norway. Western and southern European countries are classified as West European. The former East Block countries (Albania, Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Moldavia, Poland, Romania, Russia, Slovakia, Ukraine and White Russia) as well as the republics of former Yugoslavia are classified as East European. Remaining countries are placed in the non-European group. Turkey is classified as Asian and therefore falls into the non-European group. In addition, categorization by OECD-status is also tested.

Education:

The education variable is based on highest level of completed education and has a seven level scale ranging from less than 9 years of education to completed graduate studies. This is re-coded to a four level scale, again

indicating highest level of completed education; primary school, secondary school, undergraduate university and graduate university.

Age:

Four dummy variables are created indicating whether individuals were aged 16-35, 36-45, 46-55 or 56-64. In estimation on the full age distribution the first category is split into two indicating age levels between 16-25 and 26-35.

Age at Immigration:

Age at immigration is an indicator variable equal to one if the individual immigrated to Sweden before the age of 18, zero otherwise. This variable is used to capture the effect of local education on employment probabilities as well as important language and cultural skills that may more readily and proficiently be acquired if immigration occurs at a young age. Different age restrictions are tested with no notable change in results.

Child:

Child is a dummy variable equal to one for those with children under the age of three, zero otherwise.

Married:

Married is a dummy variable equal to one for those married, zero otherwise.

Local Education:

Local education is a dummy variable equal to one if an individual's highest achieved degree was attained in Sweden, zero otherwise.

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