Employment Convergence of Immigrants and Natives In Sweden*

Lena Nekby†

Abstract

This study examines the employment convergence patterns of various immigrant groups to natives in Sweden. Using data with annual information (1990-1997) on more than 200,000 individuals, the probability of being regularly employed is estimated, by gender and region of birth, for immigrants with varying duration of residence in Sweden. The results indicate that employment convergence occurs primarily during the first 10 to 15 years after immigration and that significant differences to natives remain thereafter. East and Non European immigrants indicate 55 – 70 percent lower chances of being regularly employed, compared to natives, after twenty years in Sweden.

Keywords: Immigration, Employment, Discrimination, Gender
JEL: J7, J15, J16, J21, J61

* I am grateful to Mahmood Arai for helpful comments on this and earlier drafts as well as seminar participants at the Department of Economics, Stockholm University and FIEF.
† Trade Union Institute for Economic Research (FIEF) and Department of Economics, Stockholm University. Corresponding address: FIEF, Walling. 38, 111 24 Stockholm, Sweden. Tel.: 46 (0) 8 6969911, Fax: 46 (0) 8 2077313, E-mail: lnekby@fief.se

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 birth. 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 1990-1997, with information on over 200,000 individuals, of which more than 25,000 were born abroad, the probability of being regularly employed is estimated, by gender and region of birth. 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 such, this study provides a first analysis, broken down by region of birth, of immigrant assimilation to native employment levels in the Swedish labor market. In addition, this study provides one European example of how employment convergence of immigrants to natives differs from that of the US case.

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 wage 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 to natives persists even after twenty years (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 birth 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, immigrant groups converge with time in the host country to native employment levels? Are there differences in employment convergence patterns by

region of birth or by gender? How persistent is the employment gap to natives? Do immigrant groups converge to each other in terms of employment chances over time?

This study confirms that duration of residence is positively associated with employment chances but that this effect differs by region of origin. Duration of residence has larger explanatory power for East and Non-European immigrants than Nordic and West European immigrants. No immigrant group, during the observation period, converges fully to native employment levels. Nordic and West European immigrants show, at best 15 – 30 percent lower chances of being regularly employed while East and Non-European immigrants show 55 to 70 percent lower chances. In addition immigrant groups do not appear to converge to each other. The relative position vis-à-vis natives, by region of origin, remains the same regardless of duration of residence. Non-European immigrants consistently show the largest employment gap to natives, followed by East European immigrants, regardless of gender.

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. Gender and Origin 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 success in the local labor market. However, the rate of this attenuation may differ by region of birth. 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 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.

In one of few previous studies on employment convergence in the U.S., Chiswick *et al*. (1997) find 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 (Baker and Benjamin, 1997). This implies that immigrant women may more readily lower their reservation wages and, at least initially, have higher employment rates than their male counterparts. On the other hand, cultural differences may 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 woman born in the host country (Shoeni, 1998).

Studies on immigrant women to the U.S. labor market find that initial employment levels do significantly increase with greater duration of residence in the U.S. and that disparities among women born in different countries diminish over time (Long, 1980; MacPherson & Stewart,

1989). Schoeni (1998) provides the first study on employment convergence for female immigrants to the U.S. based on longitudinal data. His findings confirm that employment convergence is significant and sizable during the first ten years in the U.S. and that there are differences by region of birth where immigrant woman from Japan, Korea and China experienced the greatest degree of employment convergence eventually reaching similar age specific employment levels as natives.

Studies on immigrants in the Swedish labor market have 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 focus to political immigration from primarily non-European countries. It is argued that these latter 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). 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)

Previous studies analysing specifically employment convergence of immigrants to natives in the Swedish labor market, yield results that region of birth has a negative differential impact

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

on employment rates but that duration of residence has a generally positive effect on employment levels. With time, immigrants, on average, close the employment-gap to natives (Arai, Regner & Schröder, 2000; Ekberg, 1991, 1994). These studies do not however analyse separately the employment convergence patterns of different immigrant groups to natives.

3. Data and Empirical Set-up

The data, provided by the Trade Union Foundation for Economic Research (FIEF), is a longitudinal dataset with yearly information from 1990-1997 on more than 200,000 individuals (1,723,512 observations). Originally stemming from LOUISE, a longitudinal database containing information on personal and demographic variables, education, income and employment status, this dataset has by FIEF been matched with the National Labor Market Board's Event Database (AMS HÄNDEL), containing detailed information on unemployment status and duration. As the sample contains information on over 25,000 individuals (206,528 observations) born abroad, this dataset is well suited to studying employment differences between immigrants and natives in the Swedish labor market.

This study aims to examine employment convergence over time by estimating employment probabilities for immigrants with varying duration of residence in Sweden, controlling for a number of personal and demographic characteristics thought to influence this probability. Throughout immigrant employment rates are compared to native rates. The idea is to test to what degree employment rates converge to native levels with increased duration of residence in the host country. Logit regressions are estimated where the dichotomous dependent variable measures whether an individual *i* was registered as *regularly employed*[2] during any of the years of the observation period, 1990-1997. Explanatory variables include region of birth, duration of residence, immigration year cohort, completed education, local education, age, age at immigration and dummy variables indicating the existence of children under the age of eighteen and marital status.

The sample used for estimation is primarily based on individuals over the age of 25 (except where explicitly stated otherwise) in order to diminish the potentially negative bias on employment probabilities due to increased participation in education, especially among the young, during the recession of the early 1990's. Students are registered as out of the labor

force. The young also show greater mobility in and out of regular employment. This implies that approximately 8 percent of the native sample (approx. 270,000 observations) is dropped as well as 9 percent of the immigrant sample (approx. 22,000 observations).

In order to appreciate the impact of region of birth on employment convergence patterns, immigrants are sorted into four regional categories; *Nordic*, *West European*, *East European* and *Non-European*. The Nordic category consists of Denmark, Finland, Iceland and Norway. Sweden, being the reference group is its own category. 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 and Cyprus are classified as Asian and therefore fall into the Non-European group. 2,448 observations are dropped due to unknown country of birth.

The duration of residence variable, y*ears in Sweden*, measures the number of years an immigrant has lived in Sweden. This variable is generated from information on year of immigration, which is available in the data from 1968 onwards. As such 54,360 observations for year of immigration are coded as missing (26 percent of the immigrant sample). Of these observations, 1200 observations are re-coded as natives as the individuals in question register being born abroad, but have both parents registered as born in Sweden (816 observations) or one parent registered as such while the other has missing information on region of birth (384 observations). The remaining missing observations are assumed to stem from immigrants arriving in Sweden before 1968 and are therefore coded, in the categorical duration of residence variable, as having lived more than twenty years in Sweden. This is motivated by the fact that the average age of these immigrants is significantly higher than those registering a year of immigration and that those with unknown year of immigration are coded as such (and not simply as missing (3512 observations)). In addition, this group of immigrants shows employment percentages larger than respective within-group average, which may be an implication of longer duration in Sweden. Due to these changes, care is taken in interpreting results for the twenty plus duration of residence category.

[2] Regularly employed is defined as registering income during the year from gainful employment or self-employment only, of at least 100 SEK. The variable is based on income and event registration.

It is also important to note that the year of immigration variable 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 any of these countries.

Age at immigration is based on the difference between immigration year and birth year. 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.[3]

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. In addition, a variable, *local education*, is generated to indicate whether or not an individuals highest degree was completed after immigration to Sweden.

Descriptive statistics, reported in Table 1, indicate that natives have the highest average employment rates for both men and women and Non-Europeans the lowest. There is less variation in mean labor force participation between immigrant groups indicating larger average unemployment levels for especially, Non-European immigrants. Immigrants tend to, on average, be older than natives with the exception of Non-European immigrants. East and Non-European immigrants have longer mean levels for duration of residence than Nordic and West European immigrants. In terms of education, Nordic immigrants stand out by having relatively small percentages with completed university degrees while Non-European men have noticeably high relative percentages with completed university degrees. Nordic and East European woman as well as Non-European men have comparably high percentages with a local education. Finally, Non-Europeans appear to have, on average, a higher percentage of individuals with children under the age of eighteen.[4]

[3] Those with missing information concerning year of immigration are coded separately. As this group largely corresponds to the more than 20 year category for duration of residence, inclusion in estimation leads to multicollinearity problems. As such, the unknown age at immigration category is used as reference category in estimation implying that point estimates cannot be interpreted. The results for this variable are therefore not shown.

[4] Age weighted means indicate an even larger percentage of individuals with children under the age of eighteen for Non Europeans, 62 percent for women and 47 percent for men.

-- Table 1 here --

Initially, pooled logit regressions are estimated on the probability of being regularly employed controlling specifically, in various model specifications, for the potentially differential impact of region of birth and duration of residence. In order to analyse if employment convergence patterns differ by region of birth and by gender, separate estimations are carried out for each of these groups. Throughout odds-ratios are reported indicating employment chances relative to natives. A number of estimations are thereafter carried out on various sub-samples of the immigrant population in order to test the robustness of the employment convergence results. Finally, the panel dimensions of the data are utilized to estimate the influence of local employment experience on convergence. More on these estimations and the results rendered are reported in the next section.

4. Empirical Results

4.1 Employment Convergence

Initially, pooled logit regressions are run in order to estimate the probability of being regularly employed for each year from 1990 – 1997, where focus is on the impact of region of birth and duration of residence on this probability. Other control variables include age, age at immigration, education, children under the age of eighteen, marital status and a female dummy variable. Table 2 shows results for three models specifications. Model (1) focuses on duration of residence and compares immigrants with different residency periods to natives in terms of chances of being regularly employed. Model (2) focuses on the impact of region of birth and model (3) combines both variables of interest.[5]

-- Table 2 here --

The results shown in Model (1) indicate that duration of residence matters. Relative to natives, a greater number of years in Sweden is associated with improved employment

[5] Note that results for the variable *age at immigration* are not shown as the reference category for this variable is the unknown (due to missing information on year of immigration) category. This is to avoid multicollinearity problems stemming from the large correspondence of this category to the more than twenty-year *duration of residence* category. The point estimates for *age at immigration* cannot therefore be interpreted and are not shown.

chances. This is consistent with theories concerning the development of local human capital, cultural understanding, information and connections with time in a new country. As the results for each level of duration of residence are significant with respect to the reference category (natives), an additional test is used to capture significant changes between duration of residence levels.[6] In other words, the odds-ratio for the 6-10 year category is significantly larger than the 1-5 year category, as is the 11-15 year category with respect to the 6-10 year category and so on. The implication, in this model specification, is that the positive association of duration of residence on employment probabilities does not diminish after a given period of residency. Previous studies on the U.S. labor market have noted a diminishing marginal impact of duration of residence in the host country on employment rates (Chiswick *et al*., 1997; Schoeni, 1998).

The results for model (2) indicate that region of birth has significant explanatory power for employment chances. The results also show that this variable has a differential impact on employment chances for immigrants born in different regions. Nordic immigrants have approximately 35 percent lower chances of being employed, West European immigrants 45 percent lower chances, East Europeans 65 percent lower chances and non-Europeans 80 percent lower chances of being regularly employed compared to natives.

Combining both variables of interest in model (3) shows that region of birth is robust to the duration of residence variable and that there is a positive association between increased duration of residence and employment odds. Note that the odds-ratio in this model for the duration variable, *years in Sweden*, indicates within-group employment convergence after controlling for immigrant status. In other words, the odds-ratio, exceeding one for those in Sweden more than ten years, does not imply that immigrants with this duration of residence surpass their native counterparts in terms of employment probabilities. Instead, the coefficients indicate that given the penalty associated with being born in a foreign country, there are improved employment chances associated with increased duration of residence.[7] Note also that, although each duration category is significant with respect to the reference

[6] Significant differences between duration of residence levels are denoted by [(a)] for the one percent level and [(aa)] for the five percent level.

[7] Regressions were also run using a continuous variable for duration of residence and 5-year categorical dummies indicating immigration year cohort. The results for region of birth were robust to potential quality differences in immigration cohorts.

category, in this model specification convergence occurs primarily during the first 15 years of residence.[8]

The age, education, child and marital status variables yield expected results. Employment chances are positively associated with age but taper off for the oldest age group (56-64), presumably due to the effect of early retirement. Similarly, higher educational levels improve individuals' chances of being regularly employed. The estimations indicate that having children under the age of eighteen is also positively correlated to an individual's chances of being regularly employed. Separate regressions by gender indicate that the positive effect of children is greater for men but positive and significant for women as well. Although 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). Finally, being married is positively associated with being regularly employed. Again separate regressions by gender indicate that the marital effect is stronger for men.

In summary, the results reported in Table 2 show that there is employment convergence over time between immigrants and natives in Sweden, that region of birth matters and has a differential impact on employment probabilities, that employment convergence occurs beyond 10 – 15 years residency and finally, that during the observation period, a significant gap to native employment levels is found even after twenty years residence in Sweden.[9]

4.2 Pooled vs. Cross-Section Estimation

There are three issues to consider when comparing pooled and cross-section estimation on employment probabilities, how much of the year-to-year variation in employment odds is due to the influence of duration of residence, potential quality differences between immigration cohorts or business cycle effects? Figure 1 and 2 show the odds-ratio, per year and separately for women and men, for immigrants with different regions of birth where the reference group is natives. These figures are based on cross-section logit estimation for each year from 1990

[8] The difference between the 16-20 year duration category and the final category in this model specification is also reported as significant. Due to the aforementioned re-coding of missing variables in the year of immigration variable however, care should be taken in interpreting results for the twenty plus duration of residence category.

[9] Similar regressions were run estimating labor force participation. Results indicate that convergence occurs only during the first five years of residence after which there is a significant and constant gap to natives indicating approximately 50% lower chance of being in the labor force relative to natives. Region of origin has a differential impact on this probability.

to 1997 using a model specification controlling for region of birth, duration of residence (five-year categorical variables), age, age at immigration, education and children. In these figures, it is apparent that there is yearly fluctuation in employment odds relative to natives. Immigrant women, regardless of region of birth, show improved employment odds from 1990 to 1991 after which the employment gap increases until 1994 and begins to narrow again thereafter. The relative position of immigrant women born in different regions does not change during the observation period. Nordic immigrants have employment odds closest to natives followed by West Europeans, East Europeans and finally Non-Europeans. Immigrant men do not exhibit as much yearly variation as their female counterparts. The employment odds are relatively stable until 1993 after which there is an increasing employment gap relative to native men. However, convergence in employment odds begins again after 1994. Nordic and West European men exhibit a very similar trend throughout the period, while again East European and Non-European men, in that order, continue to yield results showing significantly lower chances of being employed than native men.[10]

-- Figure 1 & 2 here --

Borjas has in numerous studies on the U.S. labor market pointed out that cross-section estimation confounds assimilation and cohort effects (Borjas, 1985, 1989, 1994, 1995).[11] In order to control for immigration cohort quality differences, cross-section regressions for each year in the observation period are re-estimated using a model controlling for immigration cohort by using five-year categorical variables indicating year of arrival to Sweden. In addition a continuous variable for duration of residence (cubic) is included as well as the above demographic and personal characteristics. These estimations yield less yearly fluctuation in employment odds. Estimation of the same specification excluding dummies for immigration cohort yields similar results. Less yearly fluctuation in employment odds is therefore a consequence of the model specification, using a continuous measure for duration of residence, and not attributable to cohort quality differences. Nonetheless, the results are qualitatively similar to those reported in Figures 1 and 2 and the relative position of immigrant groups vis-à-vis natives unchanged.

[10] Similar estimation using the whole sample (estimated on the all ages 16-64) shows greater variation in employment odds from year to year. Nordic immigrants in particular lost ground compared to natives in the first half of the 1990's. Nordic women went from an insignificant 10 percent lower chance of being regularly employed in 1990 to a significant 55 percent lower chance in 1994 after which the gap decreases again. Nordic men had a similar pattern beginning with 13 percent *greater* chances of being regularly employed than native men in 1990, falling to 55 percent lower chances in 1994 and recovering to 14 percent lower chances in 1997.
[11] Within-immigration year estimation is reported in Section 4.5.

To what extent cyclical economic conditions in the host country affect the composition of immigrants and subsequent employment experiences is an issue first examined by Chiswick *et al.*, (1997). In particular, this study estimates whether or not arriving in a recession has a long-term 'scarring effect' on employment odds. In order to examine the impact of business cycle variation on employment odds during the 1990's, cross-section regressions are estimated for a sub-sample of immigrants whose year of immigration coincides with a period of relatively high unemployment. Two periods are examined, the 1971-1973 period when there is a slight increase in unemployment and the 1982-1985 period when open unemployment increased from two to almost four percent. Arriving during a period of relatively high unemployment has little to no effect on female employment probabilities measured during the 1990-1997 period. There is however a notable difference in male odd-ratios when estimation is based on a sub-sample of immigrants arriving during the recession of the early 1980's. West European men narrow the employment gap to native men and have relatively better chances of being employed than Nordic men. This provides weak support for theory that this cohort of West European men may be a positive selection of immigrant men better suited to meet tight labor market conditions. In each of the specifications reported in this section, variation in employment odds between years is small, motivating use of pooled estimation techniques.[12]

4.3 Gender and Region of Birth

In order to ascertain if employment convergence over time differs by region of birth and by gender, separate logit regressions are run for each of these groups. The results, shown in Table 3, respectively for women and men, compare immigrants born in a given region to natives. 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 18 and marital status.

Female immigrants differ in their employment convergence patterns by region of birth. Nordic women with a short duration of residence, 1-5 years, have approximately 35 percent lower chances of being regularly employed compared to native women. Relative to this first duration category, there is no significant improvement in employment odds for the next level

[12] The potentially differential impact of time-effects on natives and immigrants is analysed more in Section 4.5 where time dummies are included in pooled regressions on the full sample and separately in estimation on

of duration, 6-10 years. There is however, significant improvement after ten years, Nordic women with 11-15 years of residence have closed the employment gap, showing only 15 percent lower chances of being regularly employed compared to native women. Longer duration of residence for this group is associated with an increased employment gap. West European women with 1-5 years of residence in Sweden have 35 percent lower chances of being regularly employed compared to native women. Although the odds for longer duration of residence vary from 28 to 38 percent lower chances of being regularly employed relative to natives, these odds are not significant in comparison to earlier duration categories. In other words, West European women do not appear to significantly improve their employment odds with longer duration of residence. East and Non-European women have considerably lower chances of being regularly employed compared to Nordic and West European women, for each level of duration of residence. East European women with 1-5 years in Sweden have more than 85 percent lower chances of being regularly employed relative to native women, after which this group improves to, at best, approximately 60 percent lower chances with more than 20 years residency. Duration of residence has a significant positive effect on employment chances during the first 15 years of residency, after which there is no significant improvement with increased duration of residence. Non-European women with 1-5 years in Sweden are associated with over 90 percent lower chances of being regularly employed. The employment gap for this group decreases to at best 70 percent lower chances for those with more than 20 years in Sweden. Non-European women do not reach a plateau; each level of duration is significantly associated with improved employment odds.

-- Table 3 here --

The results for immigrant men concerning duration of residence are remarkably similar to their female counterparts in terms of impact on employment probabilities. Nordic men with 1-5 years of residence in Sweden have approximately 30 percent lower chances of being regularly employed compared to native men. The 6-10 year category is associated with significantly *smaller* employment chances compared to the first duration category while the 11-15 year category shows a significant improvement over the 6-10 year category. There is no significant improvement thereafter associated with longer duration of residence. West European men with 1-5 years in Sweden have 55 percent lower chances compared to native men and therefore begin with poorer odds than West European women. After 15 years in

immigrants only, in order to address the issue of whether immigrants are more sensitive than natives in terms of

Sweden, these odds have improved to only 21 percent lower chances, after which longer duration of residence has no significant impact on employment probabilities. East European men begin with the same low odds of being regularly employed as East European women, improve these odds for the first ten years of residence, after which there is a break in the pattern with no significant improvement for the 11-15 year category but significant improvement for longer duration thereafter. After twenty years in Sweden, this group has 55 percent lower chances of being regularly employed compared to native men. Finally, Non-European men like Non-European women, begin with very poor chances of being regularly employed and improve over time to at best, 67 percent lower chances than native men. Employment convergence occurs primarily during the first 15 years of residence, although those with more than 20 years residence show a significant improvement to the preceding category.

These results indicate that region of birth has a differential impact on the effect of duration of residence on employment odds. Employment convergence appears to occur during the first 10 to 15 years of residency but has less explanatory power for Nordic immigrants and West European women. Gender differences are small; immigrant men and women born in the same region tend to have very similar employment convergence patterns. Large and significant gaps to native employment levels are found for all immigrant groups regardless of gender and duration of residence, notably so for East and Non-Europeans with 55 – 70 percent lower chances of being regularly employed compared to natives, after twenty years residence in Sweden.[13]

These results put into question the explanatory power of local human capital in eradicating the employment gap between immigrants and natives over time in the Swedish labour market. Although there is improvement in employment probabilities during especially the first 15 years that may be attributable to improvements in local human capital, no immigrant group reaches native employment levels even after twenty years in Sweden. Especially troubling is

---

employment chances to variation in the business cycle during the observation period.

[13] Immigrant groups differ significantly from natives in terms of early retirement percentages. There may also be differences in terms of propensities to study influencing labor force participation. Fourteen percent of natives are registered as out of the labor force during the 1990-1997 period compared to 24 percent of Nordic immigrants, 32 percent of W. Europeans, and 30 percent of East- and Non-Europeans. These differences may negatively bias estimates of the employment gap between immigrants and natives. As such, the above model specification was re-estimated using the full age distribution (16-64) but excluding individuals registered as out of the labor force due to studies, early retirement, military service or for unspecified reasons. Results reported in Table A1 (See Appendix) indicate a smaller employment gap to natives yet similar trends to results reported in Table 3.

that the relative position of immigrant groups, by region of birth, neither change or converge to each other with increased duration of residence. Although initial differences in employment opportunities may imply long term lower average levels of experience, seniority and on the job training, these differences can not explain the magnitude of the employment gap or the persistent differences by region of birth.[14]

4.4 Emigration bias?

Nordic immigrants yield results indicating that the shortest duration of residence category is associated with an employment gap that is similar to or *smaller* vis-à-vis natives than that of the next level, 6-10 years in Sweden. This counter-intuitive result may be the result of a positive bias due to under-reporting of duration of residence because of frequent migration or due to emigration. 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. In addition, a positive emigration bias would result if the immigrants, who chose to emigrate 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.

Year of emigration is available in the data for the years 1990-1997. Table 4 shows mean education levels for the different regions of origin comparing non-emigrants to those immigrants who emigrated within five years of immigration. With the exception of East European men, early (within five years) emigrants have significantly higher mean education levels in comparison to their non-emigrant counterparts. In addition, 31 percent of early emigrants have a university degree in comparison to 20 percent of non-emigrants. This

[14] A recent study on unemployment shows that lower employment opportunities are exacerbated by higher risk probabilities, relative natives, for employed immigrants of becoming unemployed (see Arai & Vilhelmsson, 2001).

implies that it is the more highly skilled of each immigrants group who choose to emigrate shortly after immigrating to Sweden. As higher education is associated with greater employability, one hypothesis is that it is those with higher employment probabilities that choose to emigrate or that immigrants who come to Sweden for a short limited duration do so with employment secured in advance. An alternative scenario is that labour market discrimination pushes highly skilled immigrants to leave Sweden. The latter would imply lower employment probabilities among immigrants who subsequently emigrate.

-- Table 4 here --

In order to analyse the effect of emigration on the probability of being employed, logit regressions are run including emigration dummies indicating duration of stay in Sweden before emigration.[15] The reference group consists of those immigrants who do not register a year of emigration. The results, shown in Table 5, indicate that relative to those that remain in Sweden, immigrants that emigrate within five years have greater chances of being employed than their respective non-emigrants, significantly so for Nordic and West European men and Non-Europeans in general. Only East-European men show lower chances of being employed for the early emigrant category.[16] In order to control that the results for Non-European immigrants are not driven by North American (OECD) immigrants, regressions for the Non-European group are re-estimated excluding North Americans. These estimations continue showing a significantly higher chance of being employed for early emigrants, 64 percent higher for women, and 51 percent higher for men.

These results suggest that it is the more highly skilled within each immigrant group that leave after a short duration of residence in Sweden and that, if anything, these emigrants tend to have higher chances of being regularly employed relative their non-emigrating counterparts. Early emigrants, however, constitute only a small percentage of the immigrant population in Sweden.[17] As such, the positive bias on employment odds for the first five years of residence is small.[18]

[15] These estimations use a continuous measure for years in Sweden, including a square term, as the categorical variables for years in Sweden used previously would be collinear with the emigration dummies used here.
[16] This study therefore yields results contrary to the only previous study, to date, of potential emigration bias on immigrant assimilation in the Swedish labor market, Edin *et al*., (2000).
[17] The data used here indicates that four percent of Nordic immigrants leave within five years, three percent of West Europeans, one percent of East Europeans and two percent of Non-Europeans.
[18] Inclusion of emigration dummies in estimation did not influence immigrant penalties or the coefficient for the continuous duration of residence variable.

The emigration estimates include a category dubbed *re-immigrants*, composed of those individuals that register a year of emigration preceding the year of immigration. In other words this group is composed of immigrants who have previously emigrated from Sweden only to re-immigrate at a later date. Inclusion of this category helps to alleviate the potential problem of frequent migration to Sweden. The results for the re-immigration category vary by region of birth. Eastern European re-immigrants notably differ with significant and greatly improved chances of being regularly employed relative non-emigrants. Nordic male re-immigrants, on the contrary, show significantly lower chances of being regularly employed.

4.5 Alternative Specifications

In this section, the sensitivity of the reported results to local education, higher education, previous experience, a broader definition of employment, time effects and potential immigration-cohort quality differences are tested. The results shown in Table 6, (a) and (b), are based on regressions controlling for duration of residence, age, age at immigration, education, children and marital status. Only the results for the duration of residence variable are shown.

-- Table 6(a) & (b) here --

Briefly, model (1) estimates the probability of being regularly employed on a sub-sample of immigrants who completed their education after immigrating to Sweden. This measure is based on year of completion for an individual's highest level of education and is therefore only a rough measure of local education. In particular it does not indicate how many years of an individual's education were attained in Sweden. In addition, identification excludes individuals with missing information on *year of immigration*. Results therefore need to be compared to estimation where immigrants with missing information on *year of immigration,* are excluded (See Table A2). The results show that having a Swedish degree is positively associated with higher employment probabilities for most immigrant groups, although less so for East and Non-European immigrants. Duration of residence has no clear impact on employment probabilities for those with a local education and only Nordic immigrants indicate full convergence to native employment levels.[19]

[19] Note that the local education variable may to some degree be capturing the effect of re-immigration, i.e., immigrants who have lived in Sweden and acquired a Swedish degree previously but have fewer years in

Model (2) estimates employment probabilities on a sample of immigrants and natives who have a completed undergraduate or graduate university degree. The results do not greatly alter the employment convergence patterns of respective group with the exception of East and Non-European men who show a *larger* employment gap to natives at the upper end of the education distribution. Note that separate estimation of the basic model on immigrants only,[20] yields results indicating that immigrant men have a smaller positive association between higher education and regular employment than native men.[21]

Model (3) estimates the probability of being employed in 1997 on a subset of individuals who register being regularly employed in one or more of the preceding years in the data.[22] Thirty percent of immigrants in 1997 indicate no previous employment experience in the 1990-1996 period compared to 11 percent of natives.[23] Some previous experience does narrow the employment gap to comparable natives, especially so for East and Non-European immigrants.[24] Note that changes in duration of residence have no impact on employment probabilities in this estimation.

Model (4) broadens the definition of employment to include those registered as *primarily employed*[25] in order to account for potential differences in part time employment. The results indicate that an even broader definition of employment does not alter the findings of large and

---

Sweden due to a subsequent emigration. As such the coefficients for the early *years in Sweden* category for especially Nordic immigrants, may be positively biased.

[20] Logit estimation on the probability of being regularly employed using immigrants only where the reference category for duration of residence (*years in Sweden*) is the 1-5 year duration category. In addition, an education/immigrant interaction was added to the basic model yielding results indicating clear gender differences in the correlation between education and employment. For immigrant women, higher levels of education are associated with significantly higher employment probabilities. This is true for all categories except Non-European women. Contrary results are found for immigrant men, higher education significantly lowers the positive association between education and employment. This is especially noticeable for Non-European men.

[21] Rooth (1999), looking at a sample of immigrants who received their permanent visas to Sweden between 1987-1991, finds that a larger amount of formal schooling, as measured both by pre-immigration and local education, has no statistically significant positive effect on employment probabilities for these immigrants.

[22] An ordered probit was also estimated on the number of years of registered previous experience (0 – 7 years). Results indicate significant gaps to natives in terms of the probability of having a greater number of years of previous regular employment. See Table A3 in Appendix.

[23] Lack of previous employment experience varies by region of birth; 19 percent of Nordic immigrants register not being regularly employed in the 1990-1996 period compared to 23 percent of West European immigrants, 31 percent of East European immigrants and 40 percent of non-European immigrants.

[24] The probability of being regularly employed from 1991-1997 given that one was regularly employed 1990 was also estimated yielding results indicating a significant gap to natives for all immigrant groups except West European men. See Table A4 in Appendix.

[25] Primarily employed is defined as those registering income during the year from gainful/self-employment only or primarily together with registration as partially unemployed, in labor market programs or out of the labor force for studies, early retirement or military service.

significant employment gaps to natives. East European immigrants show significant employment convergence during the first 10 to 15 years while non-Europeans continue to show significantly improved employment probabilities even after 15 years.

Model (5) includes time dummies in the basic model specification. Results indicate that general time effects do not explain the employment gap between immigrants and natives. The probability of being employed declines per year from 1990 to 1994 after which there is little change through 1997. Estimating this model on immigrants only yields results indicating that the time effects were more severe for immigrants. In other words, employment chances per year, relative to 1990, show a sharper decline in estimation on immigrants only and this decline does not bottom out in 1994 as is indicated in estimation on the full sample. The recession of the early 1990's appears to have had a more detrimental impact on immigrants than natives. This provides weak support for the notion that immigrants are more sensitive than natives to fluctuations in the business cycle.

Finally, separate regressions for each cohort of immigrants arriving to Sweden prior to 1990 were estimated. Within-immigration year estimation captures potential cohort quality differences as estimation for each year includes human capital variables removing between-group differences in worker quality across immigration cohorts. In addition, to further our understanding on the effect of duration of residence on labor force status, within-immigration year regressions are also estimated on labour force participation.[26] Note that due to a lack of observations, these regressions are estimated on the full age distribution, 16-64.

Odds ratios for the probability of being employed as well as the probability of being in the labour force for female immigrants are plotted in figures 3-6. The results confirm that there is a narrowing of the employment gap between immigrant and native women, regardless of origin of region. Again, no immigrant group converges fully to native employment levels. The results for labor force participation indicate a stronger degree of year-to-year fluctuation, due to a larger degree of fluctuation in registered unemployment levels. Nordic women indicate convergence to native levels of labor force participation after circa 15 years residence.[27]

[26] Labour force participation is defined as registering being employed, unemployed, in labor market programs or any combination of the three.

[27] Estimation on the probability of being *unemployed* yields results indicating that East European and Non-European women have significantly greater risks of being unemployed, regardless of duration of residence, than natives.

-- Figure 3-6 here --

The results for immigrant men, plotted in figures 7-10, indicate steady employment convergence over time to natives levels, reached after over twenty years of residence. Only Non-European men show a persistent employment gap to natives, irrespective of duration of residence.[28] The results for labor force participation indicate a greater degree of convergence to native levels although this estimate is insignificant for cohorts arriving in Sweden before 1975. Within-immigration year estimates on the probability of being unemployed or in labor market programs yields results indicating greater unemployment risks than natives for all male immigrants, consistently so for Non-European men.

-- Figure 7-10 here --

5. Conclusions

This study has analysed the impact of duration of residence on the employment gap between immigrants and natives in the Swedish labor market during the 1990-1997 period. Duration of residence is found to significantly decrease the employment gap to natives during primarily the first fifteen years of residence, although Non-Europeans continue to show significant improvement thereafter. Duration of residence has less explanatory power for Nordic and West European immigrants than for East and Non-European immigrants. No immigrant group converges fully to native employment levels. Nordic and West European immigrants show at best, 15 – 30 percent lower chances of being regularly employed compared to natives and East and Non-Europeans 55 – 70 percent lower chances. The relative position of immigrants, by region of origin, vis-à-vis natives remains the same, regardless of duration of residence and gender. Non-Europeans consistently show the largest employment gap to natives, followed by East Europeans.

These persistent differences put into question the power of local human capital in eradicating the employment gap between immigrants and natives over time in the Swedish labor market. Remaining supply side differences may be a consequence of initial differences in employment opportunities leading to lower average levels of experience, seniority, on the job training etc. There may also be a significant *discouraged worker* effect. The question remains however, if

[28] The uncharacteristic jump at 21 years for Non-European men is insignificant and likely due to small sample size.

these human capital differences can explain 55-70 percent lower chances of regular employment after twenty years residency in Sweden.

Alternative explanation may be found in demand side differences, i.e., in tastes for discrimination, statistical discrimination due to imperfect information or in institutional differences encouraging risk adverse behavior on the part of employers. The early 1990s are also associated with a severe economic depression. Initial work on data from 1998 - 1999 indicates that Nordic and West European immigrants close the employment gap during the economic upswing but that persistent differences to native employment levels remain for East and Non-European immigrants.

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. 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.

References

Aguilar, R. & B. Gustafsson, 1994, "Immigrants in Sweden's labour market during the 1980s." *Scandinavian Journal of Social Welfare*, No. 3, pp. 139-147.

Arai**,** M. & R. Vilhelmsson, 2001, "Immigrants' and Natives' Unemployment-risk: Productivity Differentials or Discrimination?" FIEF Working Paper Series 2001, No. 169.

Arai, M., Regnér, H. & L. Schröder, 2000, "Invandrare På den Svenska Arbetsmarknaden." Bilaga 3 Invandrare på den svenska arbetsmarknaden, Ds 2000:69.

Arai, M., Schröder, L. & R. Vilhelmsson, 2000, "En svartvit arbetsmarknad." Rapport till Expertgruppen för studier i offentlig ekonomi, Ds 2000:47.

Arrufat, J. L. & A. Zabalza, 1986, "Female Labor Supply with Taxation, Random Preferences, and Optimization Errors." *Econometrica*, Vol. 54, No. 1, pp. 47-63.

Baker, M. & D. Benjamin, 1997, "The role of the Family in Immigrants' Labor Market Activity: An Evaluation of Alternative Explanations." *American Economic Review*, Vol. 87, No. 4, pp. 705-27.

Blundell, R., Duncan, A. & C. Meghir, 1998, "Estimating Labor Supply Responses Using Tax Reforms." *Econometrica*, Vol. 66, No. 4, pp. 827-861.

Borjas, G. J., 1987, "Self-selection and the Earnings of Immigrants." *American Economic Review*, Vol. 77, No. 4, pp. 531-53.

Borjas, G. J., 1985, "Assimilation, Changes in Cohort Quality, and the Earnings of Immigrants." *Journal of Labor Economics*, Vol. 3, No. 4, pp. 463-89.

Borjas, G. J., 1989, "Immigrant and Emigrant Earnings: A Longitudinal Study." *Economic Inquiry*, Vol. 27, pp. 21-37.

Borjas, G. J., 1994, "The Economics of Immigration." *Journal of Economic Literature*, Vol. 32, No. 4, pp. 1667-1717.

Borjas, G. J., 1995, "Assimilation and changes in Cohort Quality Revisited: What Happened To Immigrant Earnings in the 1980s?" *Journal of Labor Economics*, Vol. 13, No. 2, pp. 201-45.

Borjas, G. J. & B. Bratsberg, 1996, "Who Leaves? The Outmigration of the Foreign-born." *Review of Economics and Statistics*, Vol. 28, No. 1, pp. 165-76.

Chiswick, B., Cohen, Y. & T. Zach, 1997, "The Labor Market Status Of Immigrants: Effects of the Unemployment Rate at Arrival and Duration of Residence." *Industrial and Labor Relations review*, Vol. 50, No. 2, pp. 289-303.

de los Reyes, P., 1998, "I skärningspunkten mellan genus och etnicitet. Ett ekonomiskt historiskt perspektiv på invandrarkvinnor i svenskt arbetsliv." *Arbetsmarknad och Arbetsliv*, Vol.4, No. 1, pop. 13-31.

Ekberg, J., 1991, ”Vad hände sedan? En Studie av utrikes födda på arbetsmarknaden.” *ACTA Wexionesia.* Serie2, Economy & Politics 3, Växjö.

Ekberg, J., 1994, “Economic progress of immigrants in Sweden from 1970 to 1990: a longitudinal study.” *Scandinavian Journal of Social Welfare,* No. 3, pp. 148-157.

Ekberg, J., 1999, “Immigration and the Public Sector: Income Effects for the Native Population in Sweden.” *Journal of Population Economics,* Vol.12, No. 3, pp. 411-430.

Ekberg, J. & B. Gustafsson, 1995, “Invandrare på arbetsmarknaden.” SNS förlag, Stockholm.

Edin, P-A. & O. Åslund, 2001, “Invandrare på 1990-talets arbetsmarknad.” IFAU Forskningsrapport, 2001:7.

Edin, P-A., Lalonde, R.J. & O. Åslund, 2000, ”Emigration of Immigrants and Measures of Immigrant Assimilation: Evidence From Sweden.” *Swedish Economic Policy Review,* No. 7, pp. 163-204.

Eissa, N. & J. B. Liebman, 1996, ”Labor Supply Response to the Earned Income Tax Credit.” *The Quarterly Journal of Economics,* May 1996, pp. 605-637.

Keane, M. & R. Moffit, 1998, “A Structural Model of Multiple Welfare Program Participation and Labor Supply.” *International Economic Review,* Vol. 39, No. 3, pp. 553-589.

le Grand, C. & R. Szulkin, 2000, “Permanent Disadvantage or Gradual Integration: Explaining the Immigrant-Native Earnings Gap in Sweden.” SOFI (Swedish Institute for Social Research) Working Paper Series 2000: 7.

Long, J. E., 1980, “The Effect of Americanization on Earnings: Some Evidence for Women.” *Journal of Political Economy,* Vol. 88, No. 3, pp. 620-29.

Lundborg, P., 2000, “Vilka förlorade jobbet under 1990-talet?” *Välfärdens förutsättningar. Arbetsmarknad, demografi och segregation,* Johan Fritzell (Ed.) Kommittén Välfärdsbokslut, SOU 2000:37.

MacPherson, D. A. & J. A. Stewart, 1989, “The Labor Force Participation and Earnings Profiles of Married Female Immigrants.” *Quarterly Review of Economics and Business,* Vol. 29, No. 3, pp. 57-72.

Rooth, D-O., 1999, “Refugee Immigrants in Sweden-educational investments and labour market integration.” Doctoral Dissertation, Faculty of Social Sciences, University of Lund.

Schoeni, R. F., 1998, “Labor Market Assimilation of Immigrant Women.” *Industrial and Labor Relations Review,* Vol. 51, No. 3, pp. 483-504.

Scott, K., 1999, “The Immigrant Experience: Changing Employment and Income Patterns in Sweden, 1970-1993.” Doctoral Dissertation, Faculty of Social Sciences, University of Lund.

Vilhelmsson, R., 2000, "Ethnic Differences in the Swedish Youth Labor Market." Licentiatserien 15/2000, Swedish Institute for Social Research.

Wadensjö, E., 1997, "Invandrarkvinnornas arbetsmarknad." SOU 1997:137, pp.195-212.

Österberg, T., 2000, "Economic perspectives on immigrants and intergenerational transmissions," Doctoral Dissertation, Department of Economics, Handelshögskolan, Göteborg University.

Table 1: Descriptive Statistics by Region of Birth: Age>25

	Natives	Nordic	West European	East European	Non-European
			Women		
Regularly Employed:	0.67	0.55	0.47	0.42	0.27
Labor force participation:	0.84	0.75	0.63	0.68	0.62
Age (1997):	44.1 (10.9)	47.4 (10.0)	48.2 (10.9)	45.5 (9.8)	39.2 (9.3)
Age at immigration:	--	12.2 (14.0)	12.4 (15.2)	21.5 (15.2)	27.7 (11.7)
Years in Sweden (1997):	--	10.1 (11.4)	8.0 (9.9)	12.2 (9.7)	11.4 (6.5)
Completed Education:					
Primary school:	0.26	0.38	0.35	0.29	0.44
Secondary school:	0.47	0.43	0.41	0.44	0.35
University, Undergraduate:	0.27	0.19	0.23	0.26	0.21
University, Graduate:	0.002	0.002	0.011	0.007	0.009
Local Education:	--	0.16	0.08	0.17	0.14
Children[1]:	0.41	0.34	0.29	0.41	0.56
Married:	0.55	0.50	0.56	0.59	0.59
Observations	613,683	40,704	9,253	18,391	24,445
			Men		
Regularly Employed:	0.69	0.53	0.54	0.47	0.34
Labor force participation:	0.86	0.74	0.71	0.70	0.74
Age (1997):	43.9 (10.8)	47.1 (10.1)	47.5 (10.4)	46.7 (10.3)	40.1 (8.9)
Age at immigration:	--	14.8 (15.4)	15.7 (15.6)	18.3 (15.6)	27.4 (10.6)
Years in Sweden (1997):	--	10.8 (11.2)	9.8 (10.1)	11.1 (10.3)	11.5 (6.4)
Completed Education:					
Primary school:	0.30	0.44	0.27	0.26	0.32
Secondary school:	0.45	0.44	0.49	0.52	0.39
University, undergraduate:	0.23	0.12	0.22	0.21	0.27
University, graduate:	0.010	0.005	0.025	0.016	0.021
Local Education:	--	0.13	0.12	0.13	0.20
Children[1]:	0.34	0.25	0.30	0.32	0.41
Married:	0.50	0.43	0.53	0.60	0.53
Observations	635,330	33,897	11,785	15,936	29,535

Note:
Standard deviation in parenthesis.
[1] Percentage of population with children under the age of eighteen.

Table 2: Odds Ratio for Probability of Being Employed, Sweden, 1990-1997.

	(1)	(2)	(3)
Region of Birth (ref: natives):			
Nordic		0.64*	0.54*
W. European		0.54*	0.47*
E. European		0.35*	0.32*
Non-European		0.20*	0.21*
Years in Sweden (ref: natives)[a]:			
1-5	0.17*		0.52*
6-10	0.25* [(a)]		0.78* [(a)]
11-15	0.43* [(a)]		1.18* [(a)]
16-20	0.48* [(a)]		1.17*
>20	0.60* [(a)]		1.27* [(a)]
Education: (ref: primary school)			
Secondary school	1.47*	1.47*	1.47*
University (under graduate)	2.26*	2.28*	2.27*
Graduate	4.52*	4.66*	4.69*
Age: (ref: 26-35)			
36-45	1.50*	1.52*	1.49*
46-55	1.74*	1.80*	1.72*
56-64	0.64*	0.65*	0.63*
Female	0.81*	0.80*	0.81*
Child	1.35*	1.37*	1.36*
Married	1.64*	1.65*	1.66*
Log Likelihood	-721748	-720264	-719150
N	1,304,768	1,304,768	1,304,768

Note:
Logit estimation based on sample of individuals aged 26-64. Age at immigration (year of immigration - year of birth) also included as a control variable. To avoid multicollinearity problems, the dropped reference group is the unknown category (unknown due to unknown year of immigration) i.e., the category largely corresponding to the more than 20 year category for duration of residence. This implies that the point estimates for age of immigration cannot be interpreted and are therefore not shown.
* denotes significance at 1 percent level, ** at 5 percent level.
[(a)] indicates a significant difference ([(a)] at 1% percent level, [(aa)] at 5 % level) to previous category level for duration of residence variable, *years in Sweden*. * denotes significance at 1 percent level with respect to reference category, natives.

Figure 1 & 2: Cross-Section Estimation, 1990-1997. Odds Ratio for Probability of Being Employed, Controlling for Duration of Residence, Age > 25.

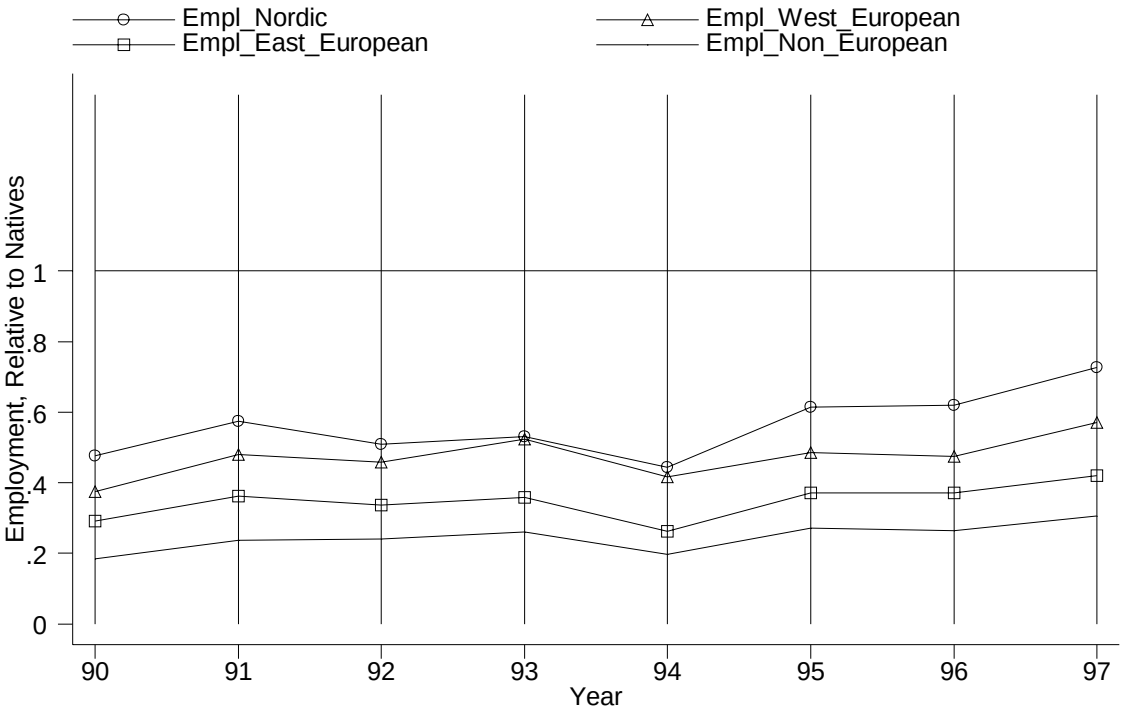

Fig. 1. Employment Odds, Female Immigrants

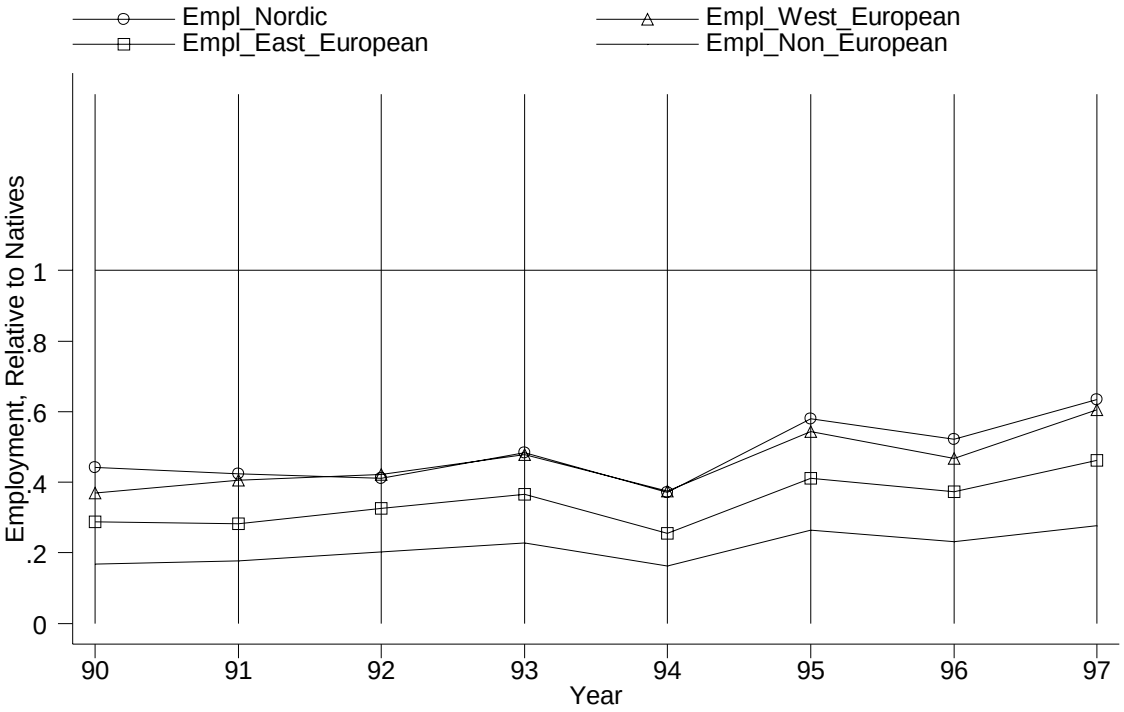

Fig. 2. Employment Odds, Male Immigrants

Table 3: Odds Ratio for Probability of Being Employed, by Region of Birth

	Nordic	W. European	E. European	Non-European
		Women		
Years in Sweden:				
(ref: natives)				
1-5	0.66*	0.65*	0.12*	0.08*
6-10	0.66*	0.72*	0.32* [(a)]	0.12* [(a)]
11-15	0.85* [(a)]	0.65*	0.41* [(a)]	0.20* [(a)]
16-20	0.73* [(a)]	0.75*	0.43*	0.22* [(aa)]
>20	0.68*	0.62*	0.40*	0.30* [(a)]
Education:				
(ref: primary school)				
Secondary school	1.64*	1.65*	1.64*	1.64*
University	2.48*	2.46*	2.46*	2.45*
Graduate	4.07*	4.00*	3.91*	4.26*
Age:				
(ref: 26-35)				
36-45	1.64*	1.65*	1.64*	1.64*
46-55	1.91*	1.93*	1.92*	1.92*
56-64	0.72*	0.73*	0.73*	0.73*
Child	1.20*	1.21*	1.21*	1.20*
Married	1.52*	1.53*	1.52*	1.51*
Log Likelihood	-337815	-320161	-325364	-326725
N	602,366	573,831	581,844	584,992
		Men		
Years in Sweden:				
(ref: natives)				
1-5	0.68*	0.45*	0.12*	0.08*
6-10	0.52* [(a)]	0.62* [(a)]	0.29* [(a)]	0.11* [(a)]
11-15	0.71* [(a)]	0.79* [(aa)]	0.33*	0.21* [(a)]
16-20	0.69*	0.73*	0.39* [(aa)]	0.22*
>20	0.70*	0.77*	0.45* [(a)]	0.33* [(a)]
Education:				
(ref: primary school)				
Secondary school	1.30*	1.32*	1.31*	1.30*
University	2.12*	2.11*	2.11*	2.03*
Graduate	5.35*	5.32*	5.47*	4.89*
Age:				
(ref: 26-35)				
36-45	1.35*	1.36*	1.36*	1.34*
46-55	1.52*	1.54*	1.54*	1.53*
56-64	0.52*	0.52*	0.52*	0.52*
Child	1.62*	1.62*	1.61*	1.58*
Married	1.89*	1.91*	1.89*	1.89*
Log Likelihood	-323230	-311337	-314096	-321112
N	613,983	595,052	598,621	608,921

Note: Logit estimation based on sample of individuals aged 26-64. Age at immigration (year of immigration - year of birth) also included as a control variable. To avoid multicollinearity problems, the dropped reference group is the unknown category (unknown due to unknown year of immigration) i.e., the category largely corresponding to the more than 20 year category for duration of residence. This implies that the point estimates for age of immigration cannot be interpreted and are therefore not shown.

* denotes significance at 1 percent level, ** at 5 percent level.

[(a)] indicates a significant difference ([(a)] at 1% percent level, [(aa)] at 5 % level) to previous category level for duration of residence variable, *years in Sweden*. * denotes significance at 1 percent level with respect to reference category, natives.

Table 4: Mean Education Level, Non-emigrants vs. Early Emigrants (emigration 1-5 years after immigration)**.**

	Non-Emigrants	Emigrants; 1-5 years
	Women	
Sweden	3.36 (1.53)	4.00* (1.30)
Nordic	2.92 (1.52)	3.81* (1.70)
W. European	3.22 (1.66)	4.05* (1.79)
E. European	3.38 (1.62)	4.55* (1.23)
Non-European	2.97 (1.66)	3.43* (1.57)
	Men	
Sweden	3.29 (1.60)	4.35* (1.49)
Nordic	2.69 (1.47)	3.43* (1.57)
W. European	3.48 (1.58)	3.79** (1.40)
E. European	3.45 (1.59)	3.70 (2.27)
Non-European	3.46 (1.69)	4.24* (1.52)

Note:
* denotes significantly greater at one percent level, comparing respective emigrant group to non-emigrants. Mean education level based on education scale [1, 7] where 1 equals less than 9 years of secondary school and 7 equals graduate education. Standard deviation in parenthesis.

Table 5: Odds Ratio for Probability of Being Employed, Including Emigration, by Region of Birth.

	Nordic	W. European	E. European	Non-European
		Women		
Emigration:				
(ref: non-emigrants)				
1-5	1.09	1.24	1.39	1.57**
6-10	0.76	0.61**	1.07	1.02
11-20	0.30*	0.22*	0.11*	0.53*
>20	0.31*	0.06*	0.06*	0.34*
Re-immigrants	0.50	0.60	1.92	0.76
Log likelihood	-339612	-322069	-326867	-327645
N	602,010	573,721	581,539	584,413
		Men		
Emigration:				
(ref: non-emigrants)				
1-5	1.39**	1.66**	0.53	1.68**
6-10	0.88	0.42*	0.55	0.57*
11-20	0.45*	0.52*	0.23*	0.43*
>20	0.39*	0.04*	0.52	0.14*
Re-immigrants	0.53**	0.93	3.91**	0.98
Log Likelihood	-326647	-314724	-317189	-323275
N	613,763	594,852	598,346	608,146

Note:
Logit estimation with controls for years in Sweden, years in Sweden squared, immigration cohort, age, age at immigration, education and children. * denotes significance at 1% level and ** significance at 5% level

Table 6(a): Alternative Specifications: Odds Ratio for Probability of Being Employed, Sweden, 1990-1997, Women

	Nordic	West European	East European	Non-European
(1) Local Education[1]:				
Years in Sweden:				
1-5	1.83*	0.74	0.47*	0.28*
6-10	1.33*	0.64**	0.84 [(a)]	0.34*
11-15	1.28	0.47*	0.70*	0.44* [(a)]
16-20	0.95[(a)]	0.64*	0.70*	0.43*
>20	0.97	0.47*	0.75*	0.49*
(2) Higher Education[2]:				
Years in Sweden:				
1-5	0.72*	0.60*	0.07*	0.06*
6-10	0.54* [(aa)]	0.50*	0.22* [(a)]	0.09* [(a)]
11-15	0.76** [(a)]	0.31* [(aa)]	0.25*	0.21* [(a)]
16-20	0.53* [(a)]	0.44*	0.31*	0.27* [(aa)]
>20	0.76* [(a)]	0.66*	1.62* [(a)]	0.34*
(3) Previous Experience[3]:				
Years in Sweden:				
1-5	0.75	0.57	0.42*	0.17*
6-10	0.65*	0.38*	0.41*	0.33*
11-15	0.73	0.49**	0.49*	0.35*
16-20	0.71**	0.47**	0.57*	0.44*
>20	0.66*	0.61*	0.53*	0.61**
(4) Broader Def. Of Employment:				
Years in Sweden:				
1-5	0.58*	0.58*	0.12*	0.07*
6-10	0.67*	0.70*	0.29* [(a)]	0.10* [(a)]
11-15	0.88* [(a)]	0.72*	0.36* [(a)]	0.15* [(a)]
16-20	0.72* [(a)]	0.81	0.38*	0.18* [(a)]
>20	0.66*	0.56* [(a)]	0.37*	0.28* [(a)]
(5) Including Year Dummies:				
Years in Sweden:				
1-5	0.58*	0.57*	0.12*	0.08*
6-10	0.63*	0.68*	0.33* [(a)]	0.15* [(a)]
11-15	0.72* [(aa)]	0.59*	0.42* [(a)]	0.25* [(a)]
16-20	0.66*	0.69*	0.41*	0.30* [(a)]
>20	0.66*	0.59*	0.41*	0.36* [(a)]
Year: (ref: 1990)				
1991	0.69*	0.69*	0.69*	0.69*
1992	0.52*	0.52*	0.52*	0.52*
1993	0.44*	0.44*	0.44*	0.44*
1994	0.39*	0.40*	0.39*	0.39*
1995	0.39*	0.40*	0.39*	0.39*
1996	0.39*	0.39*	0.38*	0.38*
1997	0.39*	0.39*	0.39*	0.38*

Note: Logit estimation with controls for age, age at immigration, education, children and marital status. * denotes significance at 1 percent level, ** at 5 percent level.
[(a)] indicates a significant difference ([(a)] at 1% percent level, [(aa)] at 5 % level) to previous category level for duration of residence variable, *years in Sweden*. * denotes significance at 1 percent level with respect to reference category, natives.
[1] Estimation on immigrants with highest degree completed in Sweden using entire age range, 16-64. Immigrants with missing information for year of immigration dropped. For comparison , see estimation results Table Ax.
[2] Estimation for higher education uses the entire age range, 16-64.
[3] Logit estimation for 1997 based on sub-sample of individuals who register being regularly employed for at least one year during the 1990-1996 period.

Table 6(b): Alternative Specifications: Odds Ratio for Probability of Being Employed, Sweden, 1990-1997, Men

	Nordic	West European	East European	Non-European
(1) Local Education[1]:				
Years in Sweden:				
1-5	1.61**	0.29*	0.52*	0.32*
6-10	1.14	0.40*	0.73*	0.27*
11-15	1.50* (aa)	0.57*	0.61*	0.46* (a)
16-20	0.94 (a)	0.45*	0.54*	0.36* (a)
>20	0.95	0.45*	0.70 (a)	0.43* (aa)
(2) Higher Education[2]:				
Years in Sweden:				
1-5	1.05	0.41*	0.08*	0.06*
6-10	0.82	0.61* (aa)	0.10*	0.06*
11-15	0.75	0.60*	0.14* (aa)	0.10* (a)
16-20	0.73	0.64*	0.20*	0.12*
>20	1.07 (aa)	0.75*	0.41* (a)	0.23* (a)
(3) Previous Experience[3]:				
Years in Sweden:				
1-5	0.70	0.59	0.33*	0.36*
6-10	0.52*	0.63	0.49*	0.40*
11-15	0.50*	0.75	0.52*	0.48*
16-20	0.63*	0.82	0.65	0.60*
>20	0.69*	0.89	0.66*	0.74
(4) Broader Def. Of Employment:				
Years in Sweden:				
1-5	0.64*	0.42*	0.09*	0.07*
6-10	0.48* (a)	0.59* (a)	0.24* (a)	0.08* (a)
11-15	0.67* (a)	0.70*	0.24*	0.16* (a)
16-20	0.69*	0.62*	0.26*	0.15*
>20	0.66*	0.58*	0.34* (a)	0.24* (a)
(5) Including Year Dummies:				
Years in Sweden:				
1-5	0.60*	0.41*	0.12*	0.08*
6-10	0.51* (aa)	0.60* (a)	0.29* (a)	0.15* (a)
11-15	1.59* (aa)	0.73*	0.33*	0.27* (a)
16-20	0.62*	0.71*	0.34*	0.30*
>20	0.68*	0.76*	0.45* (a)	0.38* (a)
Year (ref: 1990)				
1991	0.57*	0.58*	0.57*	0.57*
1992	0.38*	0.38*	0.38*	0.38*
1993	0.31*	0.31*	0.31*	0.30*
1994	0.28*	0.28*	0.28*	0.28*
1995	0.31*	0.31*	0.31*	0.30*
1996	0.33*	0.33*	0.33*	0.32*
1997	0.34*	0.34*	0.34*	0.33*

Note: Logit estimation with controls for age, age at immigration, education, children and marital status. * denotes significance at 1 percent level, ** at 5 percent level.
(a) indicates a significant difference ((a) at 1% percent level, (aa) at 5 % level) to previous category level for duration of residence variable, *years in Sweden*. * denotes significance at 1 percent level with respect to reference category, natives.
[1] Estimation on immigrants with highest degree completed in Sweden using entire age range, 16-64. Immigrants with missing information for year of immigration dropped. For comparison , see estimation results Table Ax.
[2] Estimation for higher education uses the entire age range, 16-64.
[3] Logit estimation for 1997 based on sub-sample of individuals who register being regularly employed for at least one year during the 1990-1996 period.

Figures 3-6: Labour Force Participation/Employment, Odds Ratios, Women, Age 16-64.

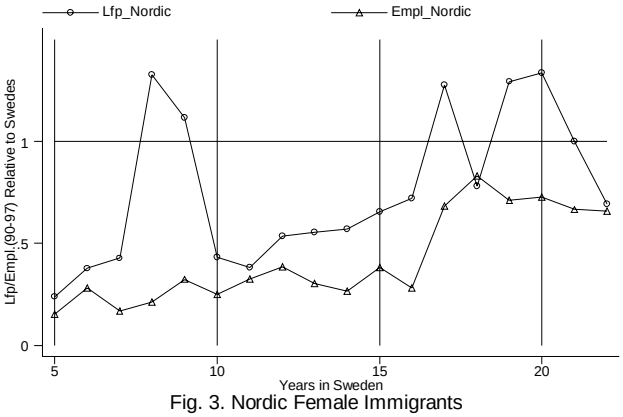

Fig. 3. Nordic Female Immigrants

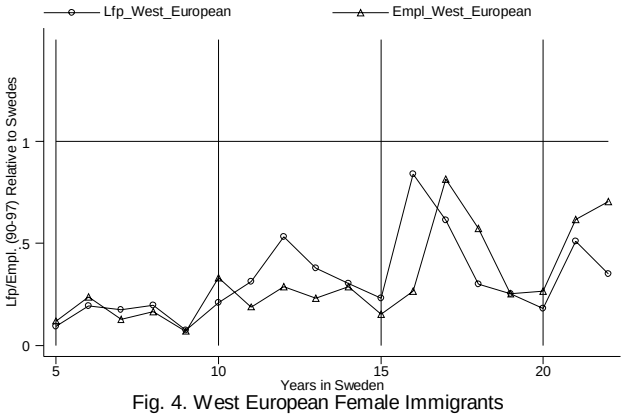

Fig. 4. West European Female Immigrants

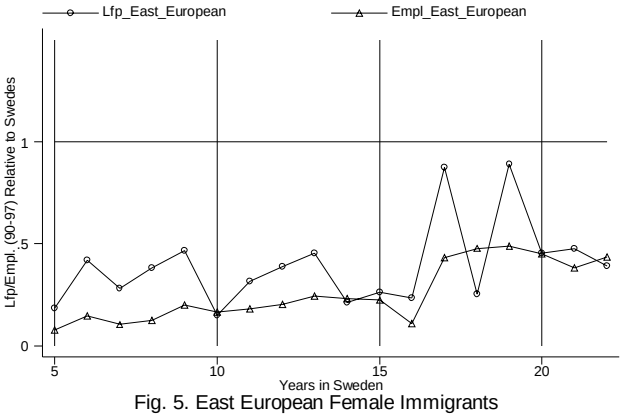

Fig. 5. East European Female Immigrants

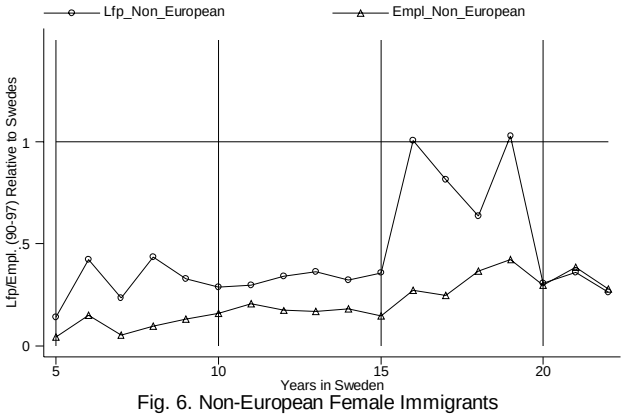

Fig. 6. Non-European Female Immigrants

Figures 7-10: Labour Force Participation/Employment, Odds Ratios, Men, Age 16-64.

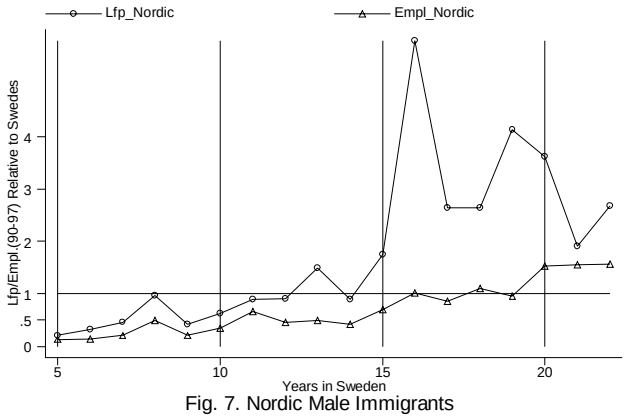

Fig. 7. Nordic Male Immigrants

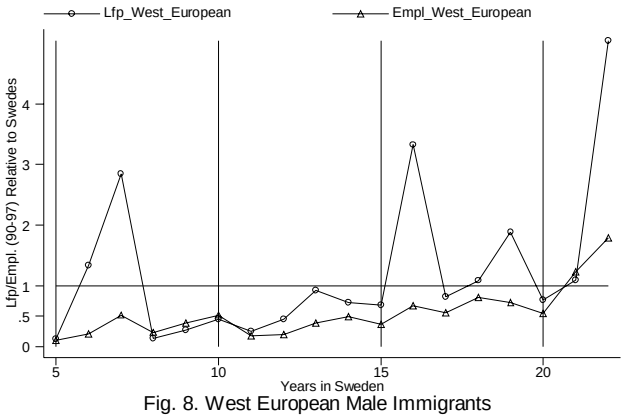

Fig. 8. West European Male Immigrants

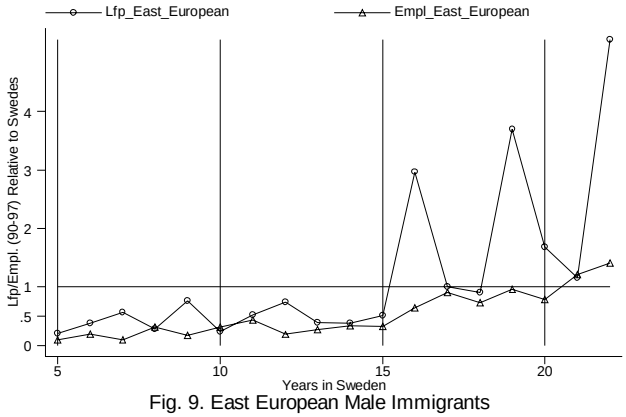

Fig. 9. East European Male Immigrants

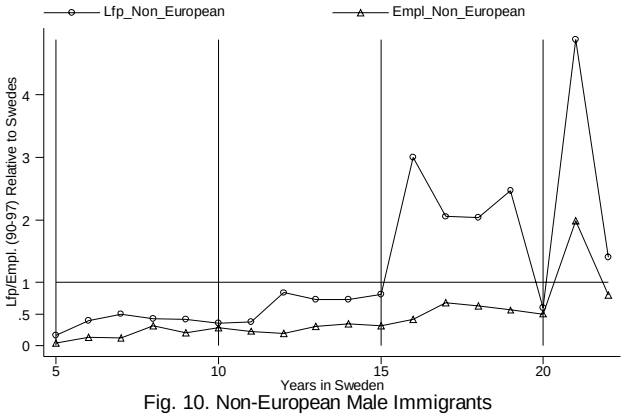

Fig. 10. Non-European Male Immigrants

Appendix:

Table A1: Odds Ratio for Probability of Being Regularly Employed.
Full age distribution (16-64), individuals out of labor force excluded.

	Nordic	W. European	E. European	Non-European
		Women		
Years in Sweden:				
(ref: natives)				
1-5	1.21*	0.65*	0.13*	0.09*
6-10	0.73* [(a)]	0.57*	0.25* [(a)]	0.09*
11-15	0.87* [(a)]	0.48*	0.34* [(a)]	0.17* [(a)]
16-20	0.77* [(aa)]	0.59*	0.41* [(a)]	0.17*
>20	0.74*	0.76* [(a)]	0.47*	0.26* [(a)]
Education:				
(ref: primary school)				
Secondary school	1.55*	1.56*	1.55*	1.54*
University	1.78*	1.77*	1.76*	1.76*
Graduate	2.96*	3.01*	2.94*	3.26*
Age:				
(ref: 16-25)				
26-35	3.62*	3.66*	3.65*	3.60*
36-45	6.35*	6.42*	6.35*	6.31*
46-55	8.87*	8.97*	8.90*	8.89*
56-64	4.93*	4.99*	4.97*	4.96*
Child	1.22*	1.22*	1.22*	1.22*
Married	1.64*	1.64*	1.64*	1.63*
Log Likelihood	-341253	-326185	-331189	-334835
N	662,656	636,776	643,948	649,601
		Men		
Years in Sweden:				
(ref: natives)				
1-5	0.98	0.60*	0.13*	0.08*
6-10	0.53* [(a)]	0.59*	0.26* [(a)]	0.09* [(aa)]
11-15	0.84* [(a)]	0.83 [(a)]	0.31* [(aa)]	0.18* [(a)]
16-20	0.76*	0.74*	0.50* [(a)]	0.18*
>20	0.75*	0.99 [(a)]	0.61* [(aa)]	0.33 [(a)]
Education:				
(ref: primary school)				
Secondary school	1.33*	1.36*	1.35*	1.33*
University	1.74*	1.73*	1.73*	1.68*
Graduate	5.03*	5.10*	5.03*	4.61*
Age:				
(ref: 16-25)				
26-35	4.41*	4.46*	4.46*	4.41*
36-45	7.05*	7.21*	7.19*	7.02*
46-55	8.85*	9.00*	8.99*	8.92*
56-64	3.71*	3.69*	3.72*	3.68*
Child	1.34*	1.34*	1.34*	1.32*
Married	1.81*	1.83*	1.81*	1.80*
Log Likelihood	-350144	-339256	-341737	-350762
N	695,710	678,056	681,331	694,324

Note: Logit estimation using full age distribution, individuals out of labor force dropped, i.e., out of the labor force due to studies, early retirement, military service or other reasons. Age at immigration (year of immigration - year of birth) also included as a control variable. To avoid multicollinearity problems, the dropped reference group is the unknown category (unknown due to unknown year of immigration) i.e., the category largely corresponding to the more than 20 year category for duration of residence. This implies that the point estimates for age of immigration cannot be interpreted and are therefore not shown.

* denotes significance at 1 percent level, ** at 5 percent level.

[(a)] indicates a significant difference ([(a)] at 1% percent level, [(aa)] at 5 % level) to previous category level for duration of residence variable, *years in Sweden*. * denotes significance at 1 percent level with respect to reference category, natives.

Table A2: Odds Ratio for Probability of Being Regularly Employed.
Immigrants with missing information on year of immigration excluded.

	Nordic	West European	East European	Non-European
		Women		
Years in Sweden:				
(ref: natives)				
1-5	0.75*	0.71**	0.36*	0.23*
6-10	0.68*	0.62*	0.58* [(a)]	0.28* [(a)]
11-15	0.87**[(a)]	0.55*	0.71* [(a)]	0.46* [(a)]
15-20	0.74* [(a)]	0.63*	0.72*	0.48*
>20	0.67* [(aa)]	0.44* [(a)]	0.54* [(a)]	0.42*
Log Likelihood	-326835	-317558	-322877	-325912
N	584,665	569,808	578,337	584,402
		Men		
Years in Sweden:				
(ref: natives)				
1-5	0.69*	0.49*	0.30*	0.25*
6-10	0.46* [(a)]	0.48*	0.40* [(a)]	0.30* [(a)]
11-15	0.62* [(a)]	0.59* [(aa)]	0.43*	0.56* [(a)]
15-20	0.59*	0.53*	0.49*	0.52*
>20	0.57*	0.47*	0.44*	0.57
Log Likelihood	-315581	-308937	-311140	-320086
N	601,423	590,917	594,394	608,011

Note: Logit estimation excluding immigrants with missing information on year of immigration. Controls for age, age at immigration, education, children and marital status included. * denotes significance at 1percent level, ** at 5 percent level.
[(a)] indicates a significant difference ([(a)] at 1% percent level, [(aa)] at 5 % level) to previous category level for duration of residence variable, *years in Sweden*. * denotes significance at 1 percent level with respect to reference category, natives.

Table A3: Ordered Probit Estimation on Number of Years of Previous Experience.

	Nordic	West European	East European	Non-European
		Women		
Years in Sweden:				
(ref: natives)				
1-5	-0.52*	-0.50*	-1.50*	-1.80*
6-10	-0.30* [(a)]	-0.28* [(a)]	-0.88* [(a)]	-1.49* [(a)]
11-15	-0.21* [(a)]	-0.30*	-0.65* [(a)]	-1.13* [(a)]
15-20	-0.26*	-0.30*	-0.70*	-1.02* [(a)]
>20	-0.26*	-0.37*	0.62* [(a)]	-0.82* [(a)]
Log Likelihood	-955834	-906486	-920477	-926074
N	602,366	573,831	581,844	584,992
		Men		
Years in Sweden:				
(ref: natives)				
1-5	-0.52*	-0.77*	-1.52*	-1.83*
6-10	-0.46*	-0.42* [(a)]	-0.92* [(a)]	-1.54* [(a)]
11-15	-0.35* [(a)]	-0.37*	-0.84* [(aa)]	-1.18* [(a)]
15-20	-0.30*	-0.34*	-0.83*	-1.07* [(a)]
>20	-0.25* [(aa)]	0.21* [(a)]	-0.56 [(a)]	-0.79* [(a)]
Log Likelihood	-928675	-895140	-902281	-922895
N	613,983	595,052	598,621	608,921

Note: Ordered probit estimation on number of years of previous experience (0 – 7) controlling for age, age at immigration, education, children and marital status.
[(a)] indicates a significant difference ([(a)] at 1% percent level, [(aa)] at 5 % level) to previous category level for duration of residence variable, *years in Sweden*. * denotes significance at 1 percent level with respect to reference category, natives.

Table A4: Odds Ratio for Probability of Being Regularly Employed, 1991 - 1997.
Estimation on individuals registered as regularly employed 1990.

	Nordic	West European	East European	Non-European
		Women		
Years in Sweden:				
(ref: natives)				
1-5	0.62*	0.90	0.40*	0.26*
6-10	0.60*	0.74**	0.51* [(aa)]	0.29*
11-15	0.73* [(aa)]	0.74**	0.61* [(aa)]	0.42* [(a)]
15-20	0.66*	1.03 [(aa)]	0.66**	0.51* [(a)]
>20	0.71*	0.74* [(aa)]	0.61*	0.55*
Log Likelihood	-222755	-211394	-214101	-214000
N	445,665	425,906	430,041	429,275
		Men		
Years in Sweden:				
(ref: natives)				
1-5	0.59*	0.68*	0.34*	0.37*
6-10	0.50* [(aa)]	0.77**	0.46* [(a)]	0.43* [(aa)]
11-15	0.65* [(a)]	1.06 [(a)]	0.58* [(a)]	0.70* [(a)]
15-20	0.65*	0.98	0.63*	0.73*
>20	0.76* [(a)]	0.97	0.70*	0.82**
Log Likelihood	-232233	-223964	-225337	-228460
N	472,997	459,397	461,139	464,964

Note: Logit estimation for 1991-1997 based on individuals registered as regularly employed 1990 with controls for age, age at immigration, education, children and marital status. * denotes significance at 1percent level, ** at 5 percent level.
[(a)] indicates a significant difference ([(a)] at 1% percent level, [(aa)] at 5 % level) to previous category level for duration of residence variable, *years in Sweden*. * denotes significance at 1 percent level with respect to reference category, natives.