IMMIGRANT EARNINGS, ASSIMILATION AND HETEROGENEITY

by

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Abstract

In this study, I examine firstly the determinants of the wage earnings for immigrants from different countries, and secondly whether their wage earnings converge to those of comparable native-born Swedes. The study is based on a longitudinal dataset, and the data refers to 1991 and 1995, respectively. The empirical results indicate that immigrants in Sweden are heterogeneous, and different income determinants, such as education, cohort-specific factors and time of residence, affect different groups of immigrants in different ways. Even after 20 years of residence, almost none of the groups appear to reach the same level of earnings as natives. In particular, the earnings of immigrants from typical refugee-sending countries tend to be much lower.

Keywords: Immigration; immigrant earnings; earnings assimilation

JEL classification: C23; J61; I20

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1 INTRODUCTION

The proportion of the foreign-born population in Sweden increased during the last few decades. The type of immigrants has also changed during this period. Earlier, immigrants were, to a large extent, related to the labor market (labor-immigrants). However, more recent immigrants have frequently fled to Sweden because of the political situation in their country of origin (refugee-immigrants). Another interesting change concerns the nationalities of immigrants. Previously, many immigrants originated from other Nordic countries, whereas in more recent decades the percentage of immigrants from Asia, South America and Africa have increased dramatically.[1] In view of this development, it is reasonable to characterize immigrants in Sweden as a heterogeneous group. This needs to be taken into consideration when different aspects of immigrants' economic behavior are analyzed. An interesting aspect may be immigrants' earning capability where, taking the observable heterogeneity into account, may enhance our understanding of whether immigrants in Sweden, in terms of earnings, are able to establish themselves successfully.

The aim of this study is firstly to examine the determinants of immigrants' wage earnings. I consider the potential heterogeneity among immigrants by separating them according to country of origin. Secondly, I will also examine whether the wage earnings of different immigrant groups tend to converge to those of comparable native-born Swedes.

Studies of immigrants' earnings were initiated by Chiswick (1978). Using cross-sectional US data from 1970, he found that newly arrived immigrant males earned less than otherwise comparable natives, but after 15 to 20 years of residence, their earnings exceeded those of comparable natives. He concluded that the correlation between the length of residence in the host country and the immigrants' earnings is positive. As an explanation, Chiswick suggested that the expected higher income in a potential host country encourages the most able or motivated among the population in the country of origin to emigrate. Their initial

[1] See Lundh & Ohlsson (1994).

earnings gap, however, is a consequence of difficulties in transferring ”human capital” across national labor markets, and their income growth is a result of investments in host country-specific human capital, which requires having lived in the host country for some length of time.[2]

Borjas (1985) has criticized the cross-sectional analysis on which Chiswick's (1978) study is based. He argues that analyses, in which differences in unobservable ”qualities”[3] between different immigrant cohorts are not taken into account, may provide a biased estimate of the effect of residence time on immigrants' earnings. Earlier cohorts may earn more than otherwise comparable cohorts who arrived later, partly because the length of residence has a positive effect on earnings (time-effect) and partly because earlier cohorts may hold better qualifications than later cohorts (cohort-effect).[4] Studies based on cross-sectional data from one single year cannot identify both the effect of residence time in the host country and the cohort effect.

In order to overcome the identification problem, Borjas (1985) used repeated cross-sectional data from 1970 and 1980. His results indicate that, when the time-effect is held constant, recent cohorts obtain lower initial earnings than earlier cohorts from the same country of origin who have similar individual characteristics. Furthermore, the results indicate that, when the cohort-effects are held constant, the time-effect on immigrants' earnings tends to be weaker than is found in Chiswick (1978). This suggests that the effect of residence time can be overestimated if the cohort-effects are ignored. Later studies by Borjas (e.g. 1987, 1989, 1991) confirm his earlier conclusions.

Although Borjas' method solves the above-mentioned problem, it generates another problem, which is related to the fact that the variables are observed at two different points in time. Economy wide changes between these two years of

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[2] See also Chiswick (1986), Stewart & Hyclak (1984) and Al-Quadsi & Shak (1991).
[3] Borjas (1985) uses the word “quality” to refer to characteristics such as productivity, ability etc.
[4] According to Borjas, the cohort differences are a result of the selection process. In contrast to Chiswick who argues for positive selection only, Borjas does not rule out the possibility that negative selection also may take place, i.e. people with poorer “quality” migrate. Whether a cohort is positively or negatively selected depends, however, on economical as well as political conditions (such as the income distribution and the level of economic development) in the host country and the country of origin, respectively, at the time of arrival (see e.g. Borjas 1987).

observation may affect individual earnings and, therefore, should be taken into account. For natives, this so-called "period-effect" can be identified without complications, but for immigrants, the period-effect and the time-effect are co-linear. Borjas (1989) solves this later problem by assuming that natives and immigrants are affected by the period-effect in a similar way. In other words, he "normalizes" the period-effect for immigrants.

LaLonde & Topel (1992) study earnings assimilation among different ethnic groups of immigrants in the US by using repeated cross-sectional data from 1970 and 1980. Their results confirm the assimilation of earnings for most ethnic groups, but no evidence is found for "quality" differences between different cohorts within each ethnic group. An interesting issue in LaLonde & Topel is that they use immigrants with more than 30 years of residence in the host country, instead of natives, as the basis for normalizing the period-effect.[5]

Several earlier studies of immigrants' earnings are based on Swedish data. Using repeated cross-sectional data from 1971 and 1980, Aguilar & Gustafsson (1991) examine the assimilation of earnings for two different cohorts; those who arrived in 1969 and 1974, respectively. The results indicate that the cohort that arrived in 1969 obtain earnings similar to natives, whereas the cohort that arrived in 1974 never reach this level. Note that, in Aguilar & Gustafsson, immigrants are pooled together into one group.

Ekberg (1994) uses the so-called "twin method", which implies that, at a certain start point in time, a native "twin" in terms of individual characteristics will be selected for each immigrant. The study is longitudinal and covers the years between 1970 and 1990. One purpose of the study is to examine whether immigrants' earnings, during the observation period, follow the same development as that of their native twin. Ekberg's results indicate that, when immigrants are considered as one single homogeneous group, there are only small differences in earnings between immigrants and their native twins. However, the differences become larger when immigrants are separated according to their county of origin.

[5] A similar study, with the same approach, has been conducted by Baker & Benjamin (1994).

Another Swedish study of interest is Scott (1999). He uses cross-sectional data from 1970 and 1990, respectively to study earnings assimilation of different cohorts of immigrants within country groups. He finds small differences in earnings between the different cohorts within each group, indicating that the length of residence in Sweden has a small effect on the earnings of immigrants, but that the effect varies between groups. Edin *et al*. (2000) use both cross-sectional data from 1996 and longitudinal data for the period 1970-1997 to study whether controlling for re-migration to the country of origin affects the estimated effect of residence time on the earnings of immigrants. They find that among those from the Nordic countries and OECD-countries, the least "successful" individuals return back to their home countries, implying that the (observed) population among these groups is "positively" selected. This is, however, not the case for immigrants from countries outside OECD. Thus, they argue that studies that do not consider the possibility that the re-migration decision is non-random, tend to overestimate the effect of residence time.[6] Furthermore, the results based on the longitudinal data show that using cross-sectional data provide overestimated effects of residence time. This is in line with results in e.g. Borjas (1985, 1987). It is important to point out that Edin *et al*. cluster immigrants into three groups only: those born in the Nordic countries, OECD-countries and outside OECD, respectively. Using cross-sectional data from 1990, Hammarstedt (2001) finds that no immigrant group reaches the same level of income as that of natives, although there are differences between immigrants from different world regions. An interesting issue in this study is that it takes the selection bias problem arising from having a job into account. In a recent study, Edin *et al*. (2003) suggest that newly arrived immigrants in Sweden tend to live in "ethnic enclaves" in metropolitan regions, and these ethnic enclaves seem to have a positive effect on immigrants' income. However, this result only applies to immigrants with a relatively low income.

[6] Re-migration may generate selection-bias if, for example, immigrants who "fail" in the host country return to the source country (or move to another host country), and those who are "successful" stay in the host country. See also Borjas and Bratsberg (1995).

The analysis in this paper is based on Borjas' method. It differs from previous studies in, at least, two ways. Firstly, by grouping immigrants according to country of origin, we will be able to consider observable heterogeneity among immigrants in a more systematic way than is the case in earlier studies. The cohort effects, the effect of residence time and the effects of individual characteristics on earnings are allowed to vary between immigrants from different countries of origin. Although, Scott (1999) does indeed consider, at least to some extent, this type of heterogeneity, his analysis is based on cross-sectional data. Secondly, I attempt to examine whether the period effect differs between immigrants and natives. To my knowledge, most of earlier studies assume that immigrants and natives are affected by the period in a similar way. However, with respect to potential heterogeneity among immigrants, there is reason to believe that the period-effect differs between immigrants and natives as well as between different groups of immigrants.[7]

The analysis here is based on the LINDA-database, which contains longitudinal individual information on, for example, demographic characteristics, earnings and education. In addition, for immigrants, the database provides information on the year of arrival in Sweden and the country of birth. These data are observed at two different points in time, 1991 and 1995, respectively. The dataset used is limited to randomly selected immigrant males from 16 different countries as well as native Swedish males.

The remainder of this paper is structured as follows: In the next section, the model and the estimation strategy will be presented. The dataset and the selected individual characteristics are presented in section 3. In section 4 the results are described and section 5 provides the main conclusions.

2 THE MODEL

In order to examine the potential determinants of the wage earnings of different immigrant groups in Sweden, and whether immigrants' wage earnings converge

[7] Aguilar & Gustafsson (1994) show that during the economic boom of the 1980s, the earnings of natives increased, while the earnings of immigrants decreased, and that this decrease was greater in the case of immigrants from outside Europe.

to those of comparable natives as the length of residence increases, I utilize a linear random-effects model.[8] The model is a modified version of the human capital model used by Borjas (1989).[9] As noted earlier, data on earnings and other individual characteristics are observed at two different points in time. The earnings equations in period *t* for immigrant *i* born in country ℓ and individual *j* born in Sweden, respectively, are written as follows

$$\ln E_{i\ell}(t) = \mathbf{X}_{i\ell}(t)\boldsymbol{\theta}_{\ell} + \tau_{1\ell} YSI_{i\ell}(t) + \tau_{2\ell} YSI^2_{i\ell}(t) + \sum_{k=2}^{K} \mu^k_{\ell} C^k_{i\ell} + \gamma_{\ell} D_{\ell}(t) + \alpha_{i\ell} + u_{i\ell}(t) \qquad (1)$$

$$\ln E_j(t) = \mathbf{X}_j(t)\tilde{\boldsymbol{\theta}} + \tilde{\gamma} D(t) + \tilde{\alpha}_j + \varepsilon_j(t) \qquad (2)$$

where $i = 1,\ldots, N$, $j = 1,\ldots, J$, $\ell = 1,\ldots,L$ and $t = 1, 2$. $E_{i\ell}(t)$ denotes the annual wage earnings in period *t* for immigrant *i* born in country ℓ, and $E_j(t)$ denotes the same for individual *j* born in Sweden. The vectors $\boldsymbol{X}_{i\ell}$ and $\boldsymbol{X}_j$ represent individual characteristics, and *D* is a period-specific dummy variable. The variable $YSI_{i\ell}(t)$ denotes the number of years that immigrant *i* from country ℓ has resided in Sweden. Furthermore, $C^2_{i\ell},\ldots,C^K_{i\ell}$ are cohort-specific dummy variables; $C^k_{i\ell}$ takes the value 1 if immigrant *i* born in country ℓ belongs to cohort *k* and 0 otherwise. Each such cohort effect is defined relative to the first (earliest arrived) cohort in the data. $u_{i\ell} \sim N(0, \sigma^2_{u_{\ell}})$ and $\varepsilon_j \sim N(0, \sigma^2_{\varepsilon})$ are random error terms, while $\alpha_{i\ell} \sim N(0, \sigma^2_{\alpha_{\ell}})$ and $\tilde{\alpha}_j \sim N(0, \sigma^2_{\tilde{\alpha}})$ represent unobservable individual-specific characteristics. The unobserved parts of each equation are assumed to be independent of each other as well as independent of the explanatory variables.

Equation (1) is estimated separately for each country of origin. It is important to note that equation (1) is not identified, since the length of residence and the period between the observation years are linearly dependent. It is,

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[8] See Greene (2003, ch. 13) for a detailed description of this type of model.

[9] Chiswich (1978) was the first to use Mincer's human capital model to study immigrants' earnings. He used residence time in the host country, measured as the number of years since arrival, as a proxy of post-immigration labour market experience. Since then, this approach has become a frequent procedure in studies of immigrants' earnings (see Fujii & Mak, 1983, for a discussion on this issue). Borjas (1989) extended the human capital model further by inserting variables that controlled for cohort-effects as well as period-effect.

therefore, necessary to impose a restriction either on the period-effect or on the time-effect. Borjas (1989, 1991) as well as Aguilar & Gustafsson (1991)[10] impose a restriction on the period-effect by assuming that the earnings of immigrants and natives are affected by the period in a similar way. Thus, they use natives as base-group for normalizing the period-effect. However, because of the potential heterogeneity among immigrants, it is likely that not only are immigrants and natives affected differently by the period, so are different immigrant groups. A normalizing base-group should reasonably be affected by the period in a similar way as the rest of the group. An appropriate base-group may be immigrants from the same country of origin. I follow, therefore, the approach used by LaLonde & Topel (1992) and use those who have resided the longest time in the host country as the basis for normalizing the period effect. More specifically, I impose a restriction on the effect of residence time on earnings for immigrants who have resided in Sweden for a long time. Given that assimilation takes place, one may assume that immigrants who have resided in the host country the longest (i.e. the first cohort in the data) are the most "assimilated" in terms of earnings. I assume, therefore, that the time of residence does not have any marginal effect on the earnings of the cohort that has spent the longest time in the host country. Practically, this means that $\tau_{1\ell}$ and $\tau_{2\ell}$ in equation (1) are set to zero for the first cohort. Thus, changes in their earnings in the period between 1991 and 1995 are assumed to be due to the period-effect and not to the time-effect. In this study, the base-cohort within each immigrant group is composed of immigrants who, in 1991, hade lived in Sweden for more than 20 years, i.e. immigrants who arrived in Sweden earlier than 1971. In order to examine whether the estimated time-effect and the cohort-effects, respectively, are affected by the treatment of the first cohort, I will also estimate equation (1) with the restriction that γ_ℓ=0.

[10] As an alternative approach, Aguilar and Gustafsson (1991) use a GNP-index as an explanatory variable to control for the period-effect. The results indicate that the business cycle has a different effect on immigrants' and native Swedes' earnings. Note that these authors have access to longitudinal data from 1971 to 1980, which makes this solution possible, while in our case, the data are observed only at two different points in time.

3 DATA AND INDIVIDUAL CHARACTERISTICS

The empirical analysis is based on the database LINDA (Longitudinal INdividual DAta)[11], which contains longitudinal individual information on, among other things, demographic characteristics, earnings and the level of education. The database contains two distinct randomly selected samples: a *population sample* and an *immigrant sample*, which are used in this paper. The population sample includes about 3% of the entire population in Sweden and the immigrant sample encompasses about 20% of the foreign-born population in Sweden. Data are observed at two different points in time, 1991 and 1995, and the panel characteristics of the data are utilized.

This study is limited to a sub-sample of native-born Swedish men and a sub-sample of foreign-born men from 16 different countries of origin.[12] Native-born Swedish men are defined as men who are born and have lived in Sweden until 1991.[13] Immigrant men are defined as foreign-born men living in Sweden on the 31st December 1991 and 1995, respectively, and who arrived in Sweden in any year during the period 1968-1990. Note that 1968 denotes the year of arrival even for those who arrived earlier than 1968.[14] Since time of residence and cohort differences are two elements of significance in this study, immigrants for whom no information on the year of arrival in Sweden is available are excluded. Note that the year of arrival in the LINDA-dataset refers to the *latest* year of arrival. It is, therefore, possible that the same individuals have different years of arrival, depending on whether the observation refers to 1991 or 1995. This could be the case if, for example, the individual hade emigrated in 1992 and then migrated back to Sweden in 1994. To avoid this problem, I follow a common convention

[11] For a detailed description of the LINDA-database, see Edin & Fredriksson (2000).
[12] The selection of birth countries included in the study is based on the number of observations in each country; the selected countries are required to contain, at least, 200 observations.
[13] Note that the data contains some individuals reported as born in Sweden as well as providing information on their year of arrival in Sweden. These categories of people can neither be identified as “immigrants” nor as “native Swedes”. They are, therefore, excluded.
[14] For a description of how the Statistics Sweden (SCB) databases up to 1995 managed the year-of-arrival, see Ekberg & Andersson (1995).

where the information on the year of arrival observed for 1991 is also used for 1995.

The selected immigrant men are between 16 and 60 years old in 1991 and between 20 and 64 years old in 1995. Moreover, individuals with annual wage earnings less than 32 200 SEK are filtered out.[15] After these limitations, 16 210 observations in the immigrant sample and 50 819 observations in the native-born sample are included in the empirical analysis. The following variables have been used:

ln(E): This variable represents the natural logarithm of annual real wage earnings, measured in terms of the 1991 price level. The calculations are based on the national consumer price index (CPI).

CHILD: A dummy variable =1 if there are children younger than 15 years of age living at home, and 0 otherwise.

MARR: A dummy variable=1 if the individual is married or cohabiting, and zero otherwise.[16] It is assumed that married/cohabiting people have a more stable existence which may, in turn, have a positive effect on earnings.

M-REG: A dummy variable =1 if the individual resides in the metropolitan regions of Stockholm, Göteborg, or Malmö, and 0 otherwise.

P-SEC: A dummy variable =1 if the major part of the earnings is acquired in the private sector of the economy. The reference group acquires their main earnings in the public sector or in non-profit organizations.

EDU: A set of dummy variables indicating the educational level of each individual for each year of estimation. To be able to make foreign and Swedish education comparable, Statistics Sweden has developed a specific method in which immigrants are grouped according to their level of education. In this paper, three educational levels are selected: secondary school (*EDU-1*), post-secondary school (*EDU-2*) and PhD-degree (*EDU-3*). The average time for each educational level is estimated to be 12, 13.5-15.7, and 19 years,

[15] Since information on employment status is not available in LINDA, I follow a rule of thumb of Statistics Sweden, where 32 200 SEK (called "basbelopp" and the amount refers to the situation in 1991) corresponds, approximately, to three months of employment. Antelius & Björklund (2000) show that studies on the determinants of wage earnings that are based on annual wage earnings and the hourly wage, respectively, provide similar results if individuals with lower earnings than the "basebelopp" are excluded.

[16] Note that cohabitants without common children cannot be identified in the dataset and, hence, will be considered as unmarried.

respectively. The schooling of the reference group is between 7 and 9 years.[17] Formal education is supposed to be the most important indicator of human capital and is, therefore, expected to have a positive effect on earnings for both immigrants and natives.

AGE: This variable, calculated by subtracting the year of birth from the year of observation, is expected to capture the total life experience. In accordance with the human capital theory, age is expected to increase earnings at a decreasing rate.

D (*Period-specific factor*): A dummy variable =1 if the observation refers to 1995 and 0 otherwise. This variable indicates changes in earnings due to economy-wide changes between 1991 and 1995.

YSI (*Years since immigration*): This variable (concerns immigrants only) measures the time (in years) the immigrant has resided in Sweden by 1991 and 1995, respectively. The calculation is completed as follows; *YSI(t)=observation year(t)- year of arrival*. *YSI* is thought to capture unobservable investments in Swedish-specific human capital, such as learning the Swedish language and/or acquiring relevant knowledge about institutional, cultural and other characteristics of the host country. In a way similar to AGE, this variable is expected to increase earnings at a decreasing rate.

C (*cohort-specific factor*): A set of dummy variables (concerning immigrants only) indicating whether the individual arrived in Sweden during 1971-1975, 1976-1980, 1981-1985, or 1986-1990. These dummy variables are supposed to capture the cohort-specific effects on earnings in comparison with the base-group (base-cohort). If successive cohorts obtain higher (lower) initial earnings than the base-cohort, a positive (negative) cohort-effect is expected. In this paper, the base-cohort, within each immigrant group, includes immigrants who arrived in Sweden earlier than 1971. For groups with few individuals that arrived prior to 1971, we use immigrants who arrived prior to 1976 as base-cohort.

In Table 1, the mean values of the characteristics of natives and immigrants from different countries of origin are presented. The table shows that the means vary substantially between different groups of immigrants. For example, immigrants born in former Czechoslovakia have the highest earnings, whereas the average earnings of immigrants born in Denmark and Germany are comparable to those of natives. On the other hand, immigrants born in Iran, Turkey and Ethiopia

[17] As noted, the lowest level of education is estimated to be 7 years, since only a small number of people (immigrants as well as natives) are expected to have fewer years of schooling (see Ekberg, 1994).

Table 1: The mean values of the characteristics of native-born Swedes and immigrants (the bold type refers to the situation in 1995).

Origin	ln*(E)*	*CHILD*	*MARR*	*M-REG*	*P-SEC*	*EDU-1*	*EDU-2*	*EDU-3*	*AGE*	*YSI*	*C 71-75*	*C 76-80*	*C 81-85*	*C 86-90*	*AGEAR*	*N-obs.*
Natives	12,06	0,30	0,50	0,35	0,78	0,50	0,24	0,01	38	-	-	-	-	-	-	51
	12,09	**0,28**	**0,52**	**0,35**	**0,78**	**0,49**	**0,25**	**0,01**								373
Immigrants	11,89	0,38	0,53	0,57	0,76	0,43	0,21	0,016	37	12	0,18	0,20	0,15	0,25	24	12
(all)	**11,95**	**0,36**	**0,55**	**0,58**	**0,77**	**0,44**	**0,23**	**0,02**								868
Denmark	12,05	0,32	0,47	0,46	0,72	0,40	0,21	0,01	37	12	0,34	0,15	0,10	0,26	25	902
	12,10	**0,31**	**0,51**	**0,46**	**0,72**	**0,40**	**0,24**	**0,02**								
Finland	11,96	0,28	0,43	0,46	0,86	0,45	0,11	0,005	37	17	0,22	0,22	0,06	0,08	21	4 627
	12,00	**0,25**	**0,45**	**0,46**	**0,86**	**0,46**	**0,13**	**0,005**								
Norway	11,99	0,25	0,37	0,43	0,82	0,43	0,20	0,01	34	8,5	0,15	0,10	0,11	0,50	26	783
	12,06	**0,29**	**0,42**	**0,43**	**0,83**	**0,46**	**0,23**	**0,016**								
Germany	12,07	0,38	0,60	0,56	0,73	0,47	0,29	0,022	41	14,5	0,25	0,19	0,12	0,15	26	404
	12,08	**0,33**	**0,60**	**0,56**	**0,72**	**0,48**	**0,33**	**0,022**								
UK.	11,95	0,43	0,56	0,61	0,78	0,33	0,28	0,037	37	11	0,21	0,18	0,20	0,30	26	528
	12,03	**0,45**	**0,61**	**0,61**	**0,77**	**0,34**	**0,33**	**0,045**								
Greece	11,86	0,53	0,67	0,68	0,71	0,37	0,24	0,019	36	14	0,29	0,27	0,10	0,15	22	317
	11,85	**0,53**	**0,67**	**0,68**	**0,75**	**0,37**	**0,26**	**0,025**								
US	11,89	0,37	0,55	0,63	0,62	0,31	0,47	0,067	35	11	0,20	0,15	0,21	0,29	24	239
	12,06	**0,46**	**0,59**	**0,64**	**0,60**	**0,28**	**0,55**	**0,075**								
Former	11,84	0,49	0,67	0,59	0,87	0,53	0,11	0,002	37	14,8	0,23	0,12	0,08	0,20	22	1 052
Yugoslavia	**11,91**	**0,41**	**0,66**	**0,59**	**0,87**	**0,54**	**0,12**	**0,002**								
Poland	11,95	0,50	0,65	0,69	0,70	0,45	0,38	0,037	38	11	0,15	0,20	0,33	0,20	26	734
	12,03	**0,40**	**0,63**	**0,69**	**0,71**	**0,46**	**0,40**	**0,045**								
Hungary	11,96	0,36	0,60	0,72	0,77	0,55	0,25	0,021	40	14	0,23	0,21	0,12	0,18	26	288
	12,00	**0,35**	**0,61**	**0,72**	**0,79**	**0,56**	**0,27**	**0,021**								
Former	12,11	0,39	0,64	0,54	0,70	0,45	0,44	0,043	42	16,5	0,09	0,08	0,08	0,15	25	231
Czechoslov.	**12,13**	**0,28**	**0,63**	**0,55**	**0,71**	**0,46**	**0,44**	**0,065**								
Romania	11,84	0,48	0,70	0,47	0,82	0,49	0,33	0,004	38	5,5	0,05	0,03	0,21	0,68	32	260
	11,95	**0,43**	**0,74**	**0,47**	**0,82**	**0,50**	**0,35**	**0,011**								
Turkey	11,68	0,60	0,75	0,75	0,77	0,28	0,14	0,002	34	11	0,15	0,35	0,19	0,23	22	437
	11,71	**0,69**	**0,81**	**0,73**	**0,76**	**0,30**	**0,15**	**0,005**								
Iran	11,63	0,43	0,56	0,63	0,55	0,46	0,35	0,013	35	6,5	0,04	0,17	0,25	0,52	28	737
	11,81	**0,47**	**0,62**	**0,67**	**0,60**	**0,42**	**0,45**	**0,023**								
Chile	11,75	0,44	0,58	0,67	0,65	0,47	0,17	0,004	36	7	0,05	0,27	0,18	0,49	28	811
	11,76	**0,35**	**0,53**	**0,68**	**0,65**	**0,47**	**0,19**	**0,009**								
Ethiopia	11,64	0,24	0,40	0,62	0,60	0,47	0,17	0,023	32	6,5	0,04	0,15	0,19	0,58	25	302
	11,77	**0,26**	**0,47**	**0,70**	**0,63**	**0,49**	**0,20**	**0,030**								

have the lowest earnings. Compared with immigrants born in European and Nordic countries, immigrants born in the main refugee-sending countries earn, in general, substantially less. Furthermore, the table shows that while earnings have increased substantially between 1991 and 1995 for some immigrant groups, they have only increased slightly for others and, in some cases, even decreased.

The educational level differs considerably between different groups of immigrants. The percentage of people with education higher than secondary school is greatest among immigrants born in the US, former Czechoslovakia and Poland. Iranian immigrants also represent a group with a fairly large percentage of highly educated people. Immigrants born in Turkey and, to some extent, in Finland are groups with a large percentage of individuals with a low level of education.

4 EMPIRICAL RESULTS

In this section, the results of the estimations of equations (1) and (2) are presented and analyzed (see Table 2). Firstly, the effects of the socio-economic variables are discussed, this is followed by a presentation of the cohort-effects, the time-effect and the period-effect. Some notes are made on the results when immigrants are treated as a "homogeneous" group and, finally, the question of earnings assimilation is addressed.

Socio-economic characteristics

The results in Table 2 indicate that the presence of children younger than 15 years of age has a positive and significant effect on earnings for immigrants born in former Yugoslavia and in Chile. The effect is not significant at the 10%-level for the remaining groups. Married/cohabiting men seem to have higher average earnings than non-married and divorced men. However, the effect differs between groups and is significant only for men born in the Nordic countries, Western Europe, Ethiopia and Poland. To reside, and probably to work, in metropolitan regions appears to have a positive effect on earnings for people born in Norway and Finland. On the other hand, for immigrants born in Poland and Iran, the effect is significantly negative.

Table 2: The estimation results (s.e. within parentheses). The dependent variable is the logarithm of the annual wage earnings.

ORIGIN	*Const.*	*CHILD*	*MARR*	*M-REG*	*P-SEC*	*EDU-1*	*EDU-2*	*EDU-3*	*AGE*	*AGE²/100*	*YSI*	*YSI²/100*	*C 71-75*	*C 76-80*	*C 81-85*	*C 86-90*	*D*
Natives	9,73*	-0,028*	0,11*	0,08*	0,18*	0,13*	0,38*	0,72*	0,093*	-0,1*	-	-	-	-	-	-	-0,023*
	(0,02)	(0,004)	(0,004)	-(0,003)	(0,004)	(0,004)	(0,005)	(0,016)	(0,001)	(0,001)	-	-	-	-	-	-	(0,002)
Immigrants	10,4*	0,003	0,040*	-0,013*	0,16*	0,07*	0,32*	0,61*	0,061*	-0,066*	0,007*	-0,016*	-0,12*	-0,14*	-0,18*	-0,19*	-0,008
(all)	(0,047)	(0,008)	(0,008)	(0,006)	(0,007)	(0,007)	(0,009)	(0,024)	(0,002)	(0,003)	(0,003)	(0,008)	(0,036)	(0,029)	(0,023)	(0,015)	(0,007)
Denmark	10,44*	-0,02	0,15*	0,005	-0,04	0,08	0,54*	0,66*	0,064*	-0,07*	0,021*	-0,07*	-0,16	-0,086	0,03	-0,018	-0,04
	(0,184)	(0,032)	(0,033)	(0,028)	(0,031)	(0,032)	(0,039)	(0,10)	(0,009)	(0,011)	(0,011)	(0,029)	(0,156)	(0,138)	(0,106)	(0,063)	(0,030)
Finland	10,47*	0,016	0,078*	0,04*	0,24*	0,05*	0,31*	0,66*	0,059*	-0,07*	-0,003	0,026	-0,093	0,0065	0,076	-0,04	0,003
	(0,08)	(0,014)	(0,013)	(0,011)	(0,014)	(0,012)	(0,018)	(0,076)	(0,004)	(0,005)	(0,006)	(0,02)	(0,065)	(0,058)	(0,049)	(0,032)	(0,009)
Norway	10,3*	-0,014	0,065**	0,065*	0,27*	0,08*	0,45*	1,06*	0,06*	-0,058*	0,0014	-0,029	0,08	-0,049	-0,23	0,021	-0,012
	(0,213)	(0,04)	(0,039)	(0,031)	(0,039)	(0,034)	(0,042)	(0,129)	(0,011)	(0,013)	(0,012)	(0,039)	(0,198)	(0,160)	(0,118)	(0,069)	(0,037)
Germany	10,5*	0,032	0,017*	0,043	0,21*	0,04	0,27*	0,7*	0,047*	-0,04*	0,034**	-0,045	-0,52*	-0,39*	-0,46*	-0,27*	-0,10*
	(0,357)	(0,047)	(0,049)	(0,044)	(0,049)	(0,058)	(0,064)	(0,163)	(0,017)	(0,021)	(0,018)	(0,06)	(0,235)	(0,201)	(0,160)	(0,106)	(0,040)
UK	9,4*	0,014	-0,09**	0,022	0,24*	0,19*	0,40*	0,54*	0,10*	-0,11*	0,014	-0,041	-0,077	-0,19	-0,091	-0,085	-0,017
	(0,337)	(0,046)	(0,049)	(0,039)	(0,044)	(0,047)	(0,048)	(0,10)	(0,017)	(0,021)	(0,016)	(0,047)	(0,237)	(0,199)	(0,150)	(0,099)	(0,046)
Greece	10,2*	0,030	0,048	0,041	0,097	0,052	0,34*	0,48*	0,056*	-0,058*	-0,038	0,092	0,56**	0,59*	0,32	0,23**	-0,036
	(0,44)	(0,061)	(0,065)	(0,052)	(0,057)	(0,059)	(0,070)	(0,162)	(0,022)	(0,028)	(0,024)	(0,066)	(0,310)	(0,261)	(0,195)	(0,133)	(0,054)
US	9,8*	0,056	0,047	0,041	0,37*	0,19*	0,37*	0,76*	0,072*	-0,08*	0,015	0,052	-0,18	-0,12	-0,12	-0,23**	0,086
	(0,480)	(0,074)	(0,075)	(0,061)	(0,062)	(0,097)	(0,090)	(0,140)	(0,025)	(0,031)	(0,025)	(0,083)	(0,350)	(0,279)	(0,209)	(0,139)	(0,069)
Former	10,5*	0,06*	0,021	-0,019	0,15*	0,094*	0,25*	1,5*	0,054*	-0,061*	-0,006	0,014	0,027	0,010	0,016	-0,11*	0,048*
Yugoslavia	(0,180)	(0,026)	(0,028)	(0,023)	(0,032)	(0,025)	(0,039)	(0,272)	(0,009)	(0,011)	(0,099)	(0,029)	(0,132)	(0,110)	(0,089)	(0,053)	(0,021)
Poland	10,18*	0,005	0,14*	-0,06**	0,15*	0,048	0,36*	0,57*	0,068*	-0,077*	0,013	-0,04	0,075	-0,083	-0,078	-0,17*	0,027
	(0,215)	(0,032)	(0,036)	(0,034)	(0,032)	(0,049)	(0,053)	(0,089)	(0,011)	(0,014)	(0,013)	(0,040)	(0,198)	(0,157)	(0,119)	(0,085)	(0,037)
Hungary	11,0*	0,011	0,09	0,013	0,10**	0,065	0,29*	0,60*	0,03**	-0,034	0,064*	-0,15*	-0,77*	-0,58*	-0,54*	-0,41*	-0,063
	(0,399)	(0,049)	(0,052)	(0,053)	(0,055)	(0,066)	(0,074)	(0,178)	(0,019)	(0,024)	(0,021)	(0,061)	(0,273)	(0,223)	(0,186)	(0,118)	(0,048)
Former	9,7*	-0,012	0,087	-0,013	0,03	0,011	0,37*	0,34*	0,099*	-0,11*	0,015	-0,08	0,67*	0,40	-0,016	-0,13	0,052
Czechoslov.	(0,478)	(0,057)	(0,062)	(0,054)	(0,057)	(0,122)	(0,123)	(0,158)	(0,023)	(0,027)	(0,024)	(0,008)	(0,303)	(0,250)	(0,201)	(0,124)	(0,039)
Romania	10,8*	-0,007	-0,022	0,008	0,10**	-0,07	0,10	0,65*	0,056*	-0,065*	0,085*	-0,47*	-	-0,49**	-0,42*	-0,37*	0,010
	(0,339)	(0,049)	(0,056)	(0,047)	(0,061)	(0,064)	(0,070)	(0,240)	(0,016)	(0,020)	(0,024)	(0,014)	-	(0,283)	(0,180)	(0,132)	(0,066)
Turkey	10,5*	0,061	-0,04	0,0004	0,067	0,11*	0,27*	0,29	0,048*	-0,056*	-0,044	0,017	0,18	0,029	0,026	0,02	0,009
	(0,291)	(0,047)	(0,054)	(0,046)	(0,044)	(0,046)	(0,063)	(0,291)	(0,014)	(0,018)	(0,017)	(0,049)	(0,265)	(0,222)	(0,169)	(0,127)	(0,052)
Iran	10,3*	0,004	-0,003	-0,055**	0,11*	-0,037	0,18*	0,31*	0,071*	-0,078*	0,055*	-0,14*	-	-0,54*	-0,55*	-0,58*	-0,024
	(0,327)	(0,040)	(0,041)	(0,032)	(0,030)	(0,046)	(0,049)	(0,118)	(0,016)	(0,019)	(0,018)	(0,072)	-	(0,197)	(0,148)	(0,118)	(0,060)
Chile	10,7*	0,07*	0,002	0,021	0,13*	0,026	0,11*	0,60*	0,053*	-0,056*	0,027*	-0,023	-	-0,53*	-0,41*	-0,40*	-0,12*
	(0,186)	(0,032)	(0,033)	(0,028)	(0,026)	(0,031)	(0,040)	(0,155)	(0,009)	(0,012)	(0,0129)	(0,048)	-	(0,158)	(0,123)	(0,085)	(0,040)
Ethiopia	11,1*	-0,062	0,12*	0,24	0,052	-0,011	-0,003	0,27*	0,025	-0,017	0,071*	-0,25*	-	-0,52*	-0,47*	-0,55*	-0,054
	(0,33)	(0,053)	(0,046)	(0,043)	(0,040)	(0,047)	(0,064)	(0,133)	(0,017)	(0,023)	(0,021)	(0,094)	-	(0,218)	(0,175)	(0,122)	(0,059)

Note: * significant at 5 percent and ** significant at 10 percent.

The results also show that people who acquire the major part of their earnings in the private sector of the economy obtain higher earnings compared to the reference group, i.e. those in the public sector and non-profit making organizations. This counts for almost all groups, but the effect varies between these groups. It is relatively substantial for immigrants born in e.g. Finland, Norway, the US, UK and Germany, whereas we cannot reject that the effect is zero for immigrants born in e.g. Turkey and Ethiopia.

An interesting result in the table concerns the effect of formal education. Having 12, instead of 7 years, of education (secondary school) increases the earnings for some immigrant groups, such as those from Finland, Norway, UK, US, former Yugoslavia and Turkey, while it does not seem to have any effect on that of the remaining groups, i.e. the effect is not significant. On the other hand, having between 13.5 and 15.7 years of education (post-secondary school) seems to increase the earnings for all groups (except for those from Romania and Ethiopia), although the level varies between groups. For example, the increase is sizeable for immigrants born in Denmark, Norway and UK, while it is small for immigrants born in Iran and Chile. Finally, having 19 years of education (PhD-degree) increases the earnings of immigrants substantially and this applies to all groups (except those from Turkey). However, in this case, the increase is highest for immigrants born in e.g. former Yugoslavia, Norway, US and Germany, and it is lowest for immigrants born in e.g. Ethiopia and Iran. A reasonable conclusion is that the labor market in Sweden values the education of immigrants born outside Europe and North America less than that of e.g. Europeans, and a plausible explanation is that Swedish employers lack knowledge about the school systems in countries outside Europe.

Furthermore, as we anticipated, earnings seem to increase, at a decreasing rate, with increasing age, and this applies to the majority of the groups. Note that immigrants born in Ethiopia make an exception, as the effect is not significant in their cases. It is noteworthy, that the results, irrespective of group, indicate that the age at which earnings are highest is almost the same, i.e. about 45 years of age. However, some groups depart from this pattern. The earnings of immigrants

born in Turkey and Finland begin to decrease at the age of 32, and for immigrants born in Germany and Norway, the highest earnings are obtained at the age of 50.

Cohort-specific effects

The results in Table 2 indicate that, ceteris paribus, successive cohorts born in Ethiopia, Chile, Iran, Romania, Hungary and Germany have lower earnings upon arrival, compared with the base-cohort (i.e. cohort 68-70 for immigrants born in Hungary and Germany and cohort 68-75 for the other mentioned groups). On the other hand, for immigrants born in Greece, successive cohorts have higher earnings than the base-cohort. Moreover, the results indicate that cohort 86-90 born in Poland, former Yugoslavia and the US have lower earnings compared with the base-cohort. For the remaining groups, the results indicate that the earnings of different cohorts are the same, as the effects are not significant.

It is likely that refugees dominate the population of immigrants born in Ethiopia, Chile, Iran, Romania and, to some extent, even Hungary. A reasonable explanation of why later arrived cohorts from these countries obtain lower earnings in comparison with the base-cohort within each group, may be the reform of the Swedish refugee-reception system carried out during the 1980s. The new system made it easier for many asylum-seekers to get a residence permit in Sweden.[18] As a result, it may have become easer for many individuals with a relatively low earnings capability to migrate to Sweden. Other explanations are also plausible. Edin, *et al*. (2000), among others, show that after 1985 the labor market situation for "refugees" worsened following the introduction of a new settlement policy called "the whole of Sweden strategy". The main objective of this policy was to distribute the refugee-immigrants more evenly between different regions in the country and thereby facilitate to integration. Although the initial intention was that the labor market situation should be taken into account when selecting regions for placement, in reality the supply of housing played the major role in the selection of many regions. If we return to Table 1, we can see

[18] In the new system, the definition of "refugee" was widened. People could be granted a residence permit in Sweden even for e.g. humanitarian reasons and family ties. In addition, in 1989, the Swedish government decided to grant residence permit for *every one* who hade applied for asylum before 1988 (see Rooth, 1999).

that more than 50% of the groups born in typical refugee countries, except for Hungary, have arrived later than 1980. Therefore, it is plausible that the majority of these groups began their residence in Sweden in regions with relatively low employment potential. This may have created a disadvantageous initial position in the labor market, with long-term negative consequences. Unfortunately, it is not possible to examine whether this is the case, since our data lack information on the immigrants' initial region of residence.

The residence time-effect

The length of residence in Sweden, which is supposed to capture unobservable investments in Swedish-specific human capital, seems to have different effects on the earnings of different immigrant groups. The table shows that the length of residence has a positive and diminishing effect on earnings for immigrants born in Ethiopia, Chile, Romania, Hungary, Denmark, and Germany. For these groups, the results indicate that immigrants, who have resided in Sweden a longer period of time, obtain higher earnings than comparable immigrants who have lived in the country a shorter time, ceteris paribus. However, for other groups, the effect of residence time on earnings is not significant. This implies that we cannot reject that the earnings of immigrants with different lengths of residence time are the same. With the exception of Denmark and Germany, these results are consistent with those in Borjas (1987). He also points out that residence time has a substantial effect on earnings for immigrants originating from the main refugee-sending countries, and that the effect is fairly weak for immigrants from relatively "wealthy" countries. According to Borjas, refugees, unlike other groups, are expected to be more motivated to adapt to the host country-specific situation. The reason may be political, i.e. they are not "allowed" to return back to their home countries. Another possible explanation is that refugees, to a greater extent than other immigrant groups, face difficulties in transferring their pre-migration labor experiences (human capital) and, as a result, they end up in low-paid jobs with relatively low initial earnings. Therefore, the length of residence plays an important role in the development of the earnings of refugee immigrants. Note, however, that immigrants born in Poland and former Czechoslovakia, who also

should be characterized as "refugees", are an exception, as the results show that the effect of residence time on their earnings is not significant.

Period-specific effect

Table 2 also shows that the period-effect is negative and significant for natives, which indicates that their earnings have decreased with about 2% between 1991 and 1995, ceteris paribus. This result is not surprising considering the recession in the early 1990s. For immigrants, the results vary for different groups. On the one hand, the period-effect is negative and significant for the earnings of immigrants born in Chile and Germany, whereas it is significantly positive for immigrants born in former Yugoslavia. For other immigrant groups, the effect of the period-specific factor is insignificant. These results are rather remarkable, as the economic recession during the period 1991 to 1995 would be expected to have a negative albeit varying period-effect on the earnings of different immigrant groups. One possible explanation is that the period-effect may include factors other than different phases of the general economic development. Nevertheless, the results do indicate some support for the idea that the period-effect on earnings varies, not only between different immigrant groups (or between the base-cohorts within each immigrant group), but also between immigrants and natives.

In order to examine whether the above results differ when the period-effect is ignored, I estimate equation (1) without the period-effect. The results are presented in Table 3.[19] If we compare the results in Table 2 and Table 3, we can note a change in the residence time-effect as well as in the cohort-effects. When the period-effect variable in Table 2 has a negative impact on earnings (as is the case with Chile and Germany), the time-effect in Table 3 becomes weaker and is no longer significant to the same extent. Table 3 also shows that, in most cases, the cohort-effects become weaker. In addition, we can see that some of the effects of residence time and/or cohort-specific effects which are not significant in Table

[19] Table 3 only contains results with respect to time of residence and cohort differences. The effects of the other explanatory variables are similar to those in Table 2 and will, therefore, not be presented.

Table 3: The estimation results where the period-specific effect is ignored (s.e. within parentheses). The dependent variable is the logarithm of the annual wage earnings.

ORIGIN	*YSI*	*YSI²/100*	*C 71-75*	*C 76-80*	*C 81-85*	*C 86-90*
Immigrants (all)	0,006* (0,002)	-0,023* (0,009)	-0,07* (0,023)	-0,12* (0,021)	-0,16* (0,018)	-0,19* (0,014)
Denmark	0,013 (0,008)	-0,068* (0,029)	0,002 (0,096)	0,046 (0,094)	0,055 (0,085)	0,016 (0,057)
Finland	-0,003 (0,006)	0,026 (0,018)	-0,08 (0,054)	-0,06 (0,051)	-0,07 (0,046)	-0,038 (0,031)
Norway	-0,001 (0,008)	-0,03 (0,036)	0,131 (0,116)	-0,01 (0,102)	0,002 (0,088)	0,03 (0,062)
Germany	0,013 (0,016)	-0,044 (0,055)	-0,10 (0,174)	-0,08 (0,162)	-0,26** (0,142)	-0,18** (0,101)
UK	0,01 (0,013)	-0,041 (0,047)	-0,007 (0,145)	-0,141 (0,134)	-0,056 (0,116)	-0,07 (0,101)
Greece	-0,04* (0,021)	0,09 (0,066)	0,71* (0,221)	0,7* (0,203)	0,39* (0,185)	0,2* (0,126)
US	0,031 (0,02)	-0,05 (0,075)	-0,51* (0,224)	-0,36** (0,202)	-0,28** (0,167)	-0,3* (0,128)
Former Yugoslavia	0,003 (0,009)	0,001 (0,03)	-0,16 (0,102)	-0,13 (0,092)	-0,07 (0,079)	-0,15* (0,051)
Poland	0,02** (0,011)	-0,043 (0,040)	-0,12 (0,118)	-0,09 (0,106)	-0,14 (0,091)	-0,20* (0,076)
Hungary	0,05* (0,018)	-0,15 (0,061)	-0,52* (0,192)	-0,4* (0,175)	-0,41* (0,160)	-0,36* (0,112)
Former Czechoslov.	-0,005 (0,023)	-0,08 (0,086)	0,47** (0,260)	0,27 (0,227)	-0,11 (0,188)	-0,17 (0,121)
Romania	0,083* (0,019)	-0,47* (0,141)	- -	-0,46* (0,200)	-0,40* (0,130)	-0,36* (0,113)
Turkey	-0,006 (0,014)	0,02 (0,049)	0,22 (0,159)	0,06 (0,147)	0,04 (0,135)	0,03 (0,116)
Iran	0,05* (0,013)	-0,14* (0,071)	- -	-0,46* (0,121)	-0,51* (0,110)	-0,55* (0,099)
Chile	0,003 (0,01)	-0,02 (0,048)	- -	-0,16** (0,095)	-0,15** (0,089)	-0,28* (0,074)
Ethiopia	0,06* (0,017)	-0,25* (0,094)	- -	-0,37* (0,141)	-0,36* (0,129)	-0,5* (0,106)

Note: * significant at 5 percent and ** significant at 10 percent.

2 tend to be significant in Table 3. Hence, the results indicate that the estimation of the cohort-effects and the time-effect are sensitive to the way in which the period-effect is treated. This implies that we should be cautious in our conclusions about these effects.

Immigrants as a homogeneous group

The estimation results for equation (1) when all immigrants are pooled together into one "homogenous" group, i.e. a pooled regression, are presented in Table 2 row 2. The results indicate that e.g. the initial earnings of successive arrived cohorts decline in comparison with those of the base-cohort. These results are in line with results in Borjas (1989) for the US and in Aguilar and Gustafsson (1991) for Sweden. These results differ from the results we obtain (presented above) when estimating the model separately for each group. This is interpreted to mean that immigrants in Sweden are heterogeneous. A more formal test, i.e. a *Chow-test* (see Greene, 2003, pp. 130 for a description) confirms that the immigrant population is heterogeneous. For that reason, studies where immigrants are treated as one homogeneous group can lead to biased estimates and induce misleading conclusions.

Earnings assimilation

In order to examine whether the earnings of immigrants converge to those of natives in accordance with the length of residence, I compare predicted earnings for each immigrant group with those of natives with identical individual characteristics. Equal earnings, i.e. 100% of the earnings of natives, or higher, indicate earnings assimilation, while lower earnings among immigrants indicate the reverse. The estimation results presented in Table 2 are used to predict immigrants' relative earnings over a 20 year period of residence in Sweden. These predictions are based on the assumptions that the individuals (both native and immigrants) are married/cohabiting, have no children under the age of 15 living at home, live in the metropolitan regions of either Stockholm, Göteborg, or Malmö[20], and their highest educational attainment is secondary school. Furthermore, 1991 is chosen as the reference year for the predictions, and the unobservable individual random effects are assumed to be equal to zero. The cohort 71-75 has been chosen for most immigrant groups, as those in this cohort have resided in Sweden for about 20 years. However, for immigrants born in Romania, Iran, Chile and

[20] These regions are interesting in the sense that they, in general, provide greater employment opportunities of different types than the rest of the country.

Ethiopia, the cohort 76-80 has been chosen.[21] For each immigrant group, I use the group's average age at the time of arrival (see Table 1) and, when a particular immigrant group is compared with natives, the average age at the time of arrival for this particular group is also used for natives. In other words, different ages are used for natives depending on which immigrant group is the object of the comparison. For example, people born in Finland are 21 years old on arrival, thus I also predict the earnings of natives at the same age. Figure 1 illustrates the predicted relative earnings for all immigrants, as well as for each immigrant group separately.

The figure shows that the development of immigrants' relative earnings over time differs between immigrant groups. It can be seen that groups whose initial earnings are less than 60% of those of comparable natives show a remarkable increase in relative earnings, at least during the first ten years after arrival. However, the relative earnings of immigrants born in Germany tend to increase even after 20 years in Sweden. Groups whose initial earnings correspond to about 80% of those of natives show no important change in relative earnings over time. Moreover, there is a third category of immigrants; those whose initial relative earnings correspond to 90% or more of those of natives. It can be seen in the figure that for this category their relative earnings decrease with increasing length of residence in Sweden. It is important to point out that, after 20 years of residence, almost no single immigrant group tends to obtain a similar level of earnings as natives, i.e. to have achieved complete assimilation. In general, this is in line with the results in Edin, *et. al*. (2000). However, note that immigrants born in former Czechoslovakia are an exception, because even though their relative earnings tend to decrease over time, the figure shows that they obtain considerably higher earnings than natives. We should, however, note that the earnings for this particular group may be overestimated, as the time-effect, on which the earnings profile is based, is insignificant at conventional levels (see Table 2).

[21] This means that the last five years in the figure are a prediction, as these cohorts have only resided for 15 years in Sweden.

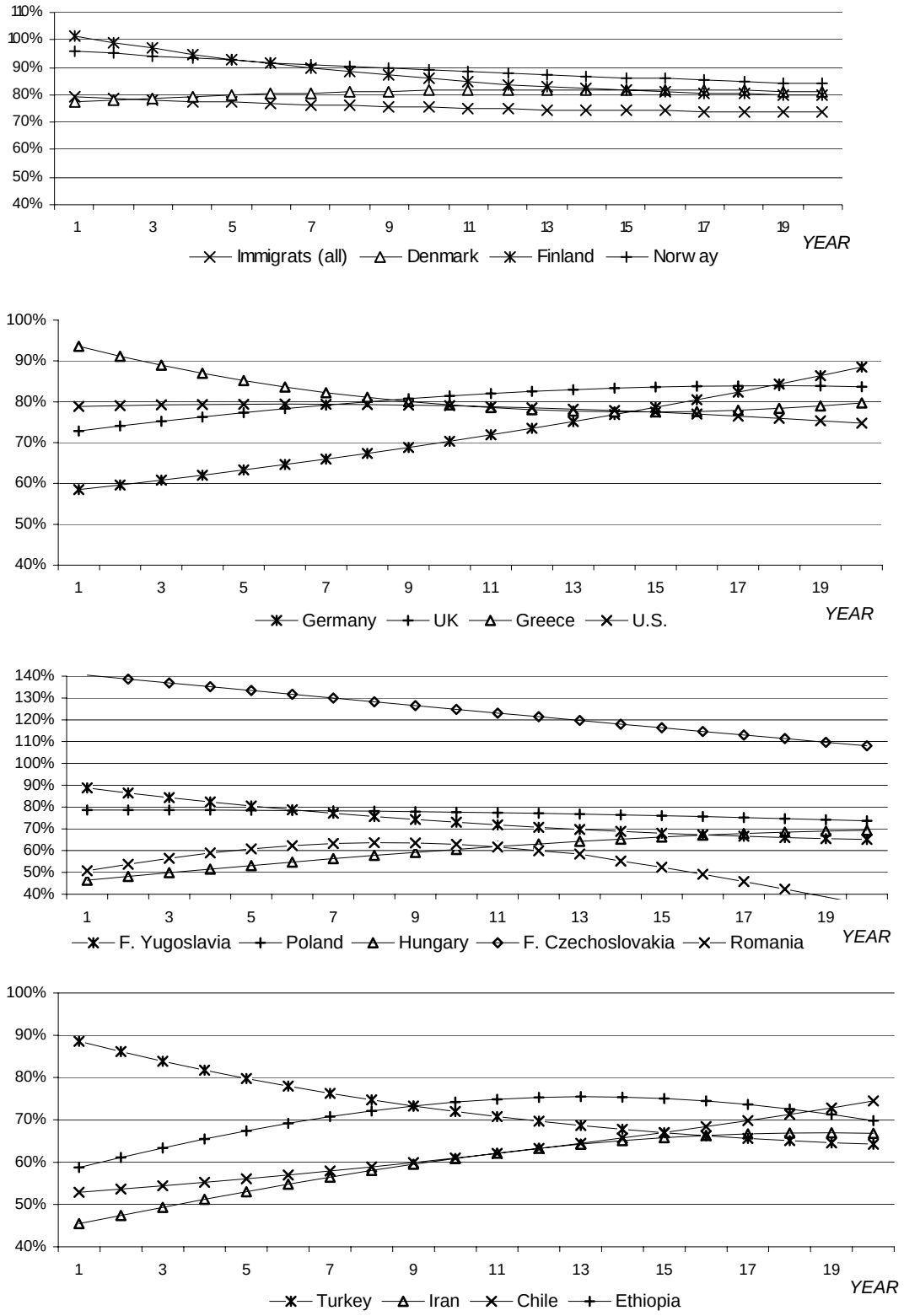

Figure 1. The predicted earnings development during 20 years of residence in the host country (Sweden) for Cohort 71-75.

Another exception is immigrants born in Finland whose earnings seem to correspond to those of comparable natives shortly after arrival. However, with increasing residence time in Sweden, their relative earnings appear to decrease and end up at 80% of those of natives. A possible explanation is that the immigrants from Finland act according to a plan, which implies that they work hard during a fairly short period of time after arrival in order to accumulate enough capital to establish e.g. a business of their own in their homeland after a return migration. Accordingly, these immigrants are expected to have a relatively high labor supply upon arrival and, consequently, fairly high initial earnings. However, for those who do not return to Finland, i.e. those who give up the original plan, their labor supply and, thus, their earnings are likely to decrease with increasing residence time.[22] Their low average age on arrival (21 years, see Table 1) supports this idea. We also see that immigrants born in Turkey, Greece, former Yugoslavia and Norway show a similar earnings profile. The common feature for these immigrant groups is that they are labor-related immigrants, and their average age at arrival is relatively young. Therefore, the interpretation of the earnings profile for immigrants born in Finland may also apply to these groups.

Based on these results, we may conclude that immigrants originating from countries where refugees generally dominate the migration to Sweden (such as Iran, Ethiopia and Chile) receive the lowest earnings. After 20 years of residence in Sweden, their earnings reach only about 70% of those of comparable natives. This also applies to immigrants born in Hungary. Immigrants from Romania have extremely low earnings relative to comparable natives, especially during the last five years of the period analyzed. One possible explanation is that they have a fairly short working-life in Sweden, as their average age is relatively high (33 years, see Table 1, column 16, *AGEAR*). Immigrants born in relatively rich countries (i.e. the US, Germany, and UK) appear to do relatively "well" in Sweden as their earnings reach 80% of those of natives. Immigrants born in Poland and former Czechoslovakia also seem to do. The reason may be that, although these immigrants can officially be characterized as "refugees", they are, to some extent, labor-related immigrants.

[22] This argument is suggested in Ekberg (1994).

The result that immigrants from typical refugee-countries are not doing well, in terms of earnings, is confirmed in Borjas (1987) for the US and Edin *et al*. (2000) for Sweden. However, my results provide a more detailed picture of how the earnings of different immigrant groups develop as the length of residence increases. Although the earnings of immigrants (as a homogenous group) do not seem to assimilate fully, their earnings do appear to reach almost 80% of those of comparable natives (see Figure 1). The proportion of the immigrant groups with decreasing relative earnings (such as those from Finland, Norway, Greece, former Yugoslavia, see Figure 1) comprises almost 60% of the immigrant population on which the above-mentioned estimation is based (see Table 1). This implies that, when immigrants are treated as a single group, the development of their earnings reflects, to a large extent, the pattern of the larger groups. In other words, the earnings development of smaller groups cannot be observed.

It is important to point out that my results do not consider the selection problems that follow if immigrants' re-migration decision is non-random. As noted in the introduction, Edin *et al*. (2000) find that the (observed) population of immigrants from the Nordic and the OECD-countries are "positively" selected, as the least "successful" individuals return back to their home countries. This is, however, not the case for immigrants from countries outside the OECD.[23] Given that the results in Edin *et al*. (2000) are valid, the estimations of the effect of residence time on earnings for immigrants born in the Nordic and OECD-countries may be overestimated.

5 CONCLUSIONS

This paper examines the factors that determine the earnings of immigrant men in Sweden, and whether their earnings converge to those of comparable natives. A modified form of the human capital equation is estimated separately for 16 different groups of immigrants, and for native-born Swedes.

[23] A similar study by Borjas & Bratsberg (1995) examines the re-migration among immigrants in the US. They argue that if the immigrants are initially "positively" selected, those who "fail" will return to their home countries, and if the opposite is true, i.e. if they are "negatively" selected initially, those who "succeed" will return.

Formal education seems to be an important determinant of the earnings of immigrants. In general, highly educated immigrants obtain higher earnings compared to those with a relatively low level of education. Immigrants who work in the private sector obtain higher earnings than those who work within the public sector or in non-profit organizations. Cohort-specific effects, which are related to the time (period) of arrival, are negative for some immigrant groups, i.e. later cohorts obtain lower earnings than earlier cohorts, ceteris paribus. This is valid, in particular, for immigrants who originate from the main refugee-sending countries, but it also applies to immigrants born in Germany. The length of residence plays a significant role for the development of these immigrants' earnings, which indicates that the monetary returns from investments in Swedish-specific human capital are positive for "refugee-immigrants". Furthermore, there are at least weak indications that period-specific factors affect immigrants' earnings differently than those of natives.

With regard to the earnings development of immigrants as the length of residence increases, the empirical findings indicate that the earnings development varies according to country of origin. Immigrants from typical refugee-sending countries (except for those from Poland and former Czechoslovakia) tend to have considerably lower initial earnings than natives, but their earnings increase rapidly, at least during the first ten years after arrival. Several immigrant groups, especially those from West European countries, tend to have relatively high initial earnings, and their earnings increase only slightly as the time of residence increases. A third category of immigrants tends to have relatively high initial earnings, but these decrease as the time of residence increases. However, with the exception of immigrants from former Czechoslovakia, the empirical findings indicated that no immigrant group reaches the same earnings level as natives after 20 years of residence in Sweden.

A conclusion that can be drawn from this study is that immigrants in Sweden seem to be heterogeneous. Our findings suggest that the country of origin and the period of arrival in the host country (cohort differences) may be factors of importance for the development of immigrants' earnings with increasing length of residence in the host country. Studies where immigrants are pooled into a single

group, or grouped into a few categories, miss the heterogeneity among immigrants.

This study has, however, at least two limitations. Firstly, it includes only immigrants who have not emigrated from Sweden, i.e. we do not analyze the original population of immigrants. This may generate a selection-bias problem that can affect our estimates, if the emigration decision turns out to be a non-random. Secondly, the model is conditioned on the assumption that the effect of the length of residence time on earnings for the base-cohort, i.e. the first arrived cohort, is equal to zero. The reason for this is to be able to normalize the period-effect, and, thus, identify the time-effect and the cohort-effects. However, we cannot be certain that the effect of the length of residence time and the cohort-effects are not over- or underestimated, as the effects may be sensitive to the restrictions, on which the model is based. Moreover, the normalization of the period-effect, itself (regardless of the base-cohort), implies that we cannot be sure about the "true" period-effect on earnings for each individual cohort.

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