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Emigration of immigrants and measures of immigrant assimilation: Evidence from Sweden

Per-Anders Edin, Robert J. LaLonde, and Olof Åslund *

Summary

■ Most previously used measures of immigrant labour market assimilation will be biased if there is non-random emigration of immigrants. We use longitudinal data on immigration to Sweden 1970-1990 to examine the extent and pattern of immigrant emigration and its consequences for measures of assimilation. A large proportion of the immigrants leave the host country shortly after arrival; within five years, more than a quarter of the people studied emigrated. As expected, economic migrants are much more likely to emigrate than political ones. Further, within these two groups, it is the least economically successful who leave. This creates the impression that the well-being of immigrants relative to that of the native population improves over time in Sweden. However, a failure to adjust for emigration leads to an overestimation of the rate of economic assimilation, for Nordic and OECD immigrants by as much as 90 per cent or more. ■

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1. Introduction

Immigration to developed countries accelerated during the last three decades so that by the beginning of the 1990s, immigrants accounted for a substantial proportion of the labour force in many western economies (Simon, 1989). At the same time that immigration rates rose, the labour market performance of recently arrived immigrants generally declined compared to that of the native born population in these countries.

Sweden has also experienced a substantial increase in its immigrant population as well as an apparent decline in the relative skills of recent immigrant arrivals (as measured by their earnings). By 1997, the proportion of immigrants in the population was nearly 11 per cent. This percentage share of the population was actually higher than the corresponding percentage in the US—which is often called a "nation of immigrants". At the same time as the immigrant population grew, the ratio of new immigrant earnings to those of the native population fell from 88 per cent during the early 1970s to 54 per cent at the beginning of the 1990s.

In many western nations, the increased presence of immigrants with relatively poor labour market outcomes has increased the interest of policy makers in both the likelihood and the rate at which immi-

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grants assimilate into their labour forces. These questions are of interest not only for an understanding of how the decline in immigrant earnings has contributed to income inequality, but also for its implications regarding the use of the social welfare system by immigrants and the fiscal burden, if any, that is imposed on the native population.

Measures of immigrant assimilation may be distorted if a significant fraction of immigrants emigrate back to their home country or to a third country. A cohort of new immigrants may appear to assimilate rapidly into the Swedish work force if the least skilled and least successful among them leave Sweden. Under these circumstances, analysts would compare the earnings of the native population over time to those of the most successful immigrants. Earnings differences between natives and immigrants would narrow, but not because these immigrants acquired country-specific skills that improved their labour market performance. Instead, earnings differences narrowed because the least prosperous immigrants have migrated.

This paper examines how measures of immigrant assimilation are affected by emigration. This question is recognised to be important in order to determine whether evidence of earnings convergence between immigrants and natives can be interpreted as assimilation. However, because of the limitations of the data used in most studies of immigrants, little is known about the empirical importance of this question. For a number of reasons, the Swedish experience offers a unique opportunity to study the relationship between measures of immigrant assimilation and emigration patterns. First, using the Swedish register data, we can construct a longitudinal database that follows individual immigrants from the time they migrate to Sweden until they leave the country. The "LINDA" database contains a representative sample of three per cent of the Swedish population during each year between 1970 and 1998 (Edin and Fredriksson, 2000). It includes information on immigrants, the year of immigration, their country of origin, earnings and social assistance receipts. We also constructed a measure of the year of emigration. Accordingly, a second advantage of studying the Swedish experience is that we can use this unique database to examine the importance of emigration in a developed country that has a comparatively high percentage of immigrants in its population.

Finally, a third advantage of studying the Swedish experience is that Sweden has received substantial numbers of both economic and political immigrants. Theory suggests that the incentives of these two

groups to migrate are different. The economic migrants are "self-selected" to succeed in the Swedish labour market, whereas the same is not necessarily the case for the political migrants. Further, the incentives (including restrictions) to emigrate back to their home country are also likely to differ between economic and political migrants. Political migrants would be less motivated by economic factors to emigrate. Because of shortcomings in other databases, this issue has been difficult to address in other countries. By contrast, we can examine separately how assimilation rates and emigration patterns differ between these two groups of immigrants.

In this paper, we first review the existing literature on the characteristics of Swedish immigrants. In section 3, we consider alternative explanations for emigration. In section 4, we describe our data and present certain summary statistics. In section 5, we examine the pattern of emigration from Sweden. Section 6 considers alternative measures of immigrant assimilation and their sensitivity to the patterns of emigration. Our concluding remarks follow in section 7.

2. Immigration to Sweden

Like many other countries, Sweden has experienced a rapid growth of the foreign-born population over the last decades. In 1997, 11 per cent of the Swedish population was born outside the country. The economic migrants are largely from the OECD countries. About 30 per cent of the total immigrant population has originated from the Nordic countries, and approximately two-thirds of this group came from Finland. Citizens of these countries have had the right to migrate freely since the 1950s. The political migrants are mostly from non-OECD countries and the timing of their immigration reflects major political events during the last half of the 20th century: e.g. Chile in the 1970s, Poland in the early 1980s, Iran and Iraq in the later part of the 1980s, and former Yugoslavia in the 1990s.

During the 1960s, economic or "labour" migration dominated the inflow of immigrants to Sweden. This flow reached a peak in 1970 when almost 80,000 people arrived. Two years later, labour migration from outside the Nordic countries was essentially stopped (Svanberg and Tydén, 1998). Since then, there has been a shift from labour to refugee migration. People have arrived from countries that experienced political upheavals. Accordingly, during the early period covered by our study, the majority of immigrants in our sample migrated

for economic reasons. During the later period however, a majority of immigrants entered Sweden on political grounds.

A substantial literature already documents the labour market performance of immigrants to Sweden (see Arai et al., 1999). As in other western countries, the economic performance of Swedish immigrants varies substantially according to their country of origin. This relationship appears to hold both for recent immigrants and for earlier migrants who arrived prior to 1970. Differences in educational attainment have not explained a substantial portion of the difference in immigrant performance. Among college-educated immigrants, those from Western Europe have earned substantially more than those from Southern Europe (Wadensjö, 1992). Furthermore, Rooth (1999) shows that labour market performance varies by country of origin among refugees arriving in the late 1980s, and that unobserved characteristics account for an important part of the difference.

The existing literature also provides evidence that, as in other western countries, the relative earnings of immigrants compared to the native population have declined (Aguilar and Gustafsson, 1994; Scott, 1999). According to Ekberg (1993), immigrants earned on average 20 per cent more than natives in the late 1960s; twenty years later these figures were reversed. This decline did not result from a decline in immigrants' relative schooling or labour market experience (Wadensjö, 1994). Instead, the decline appears to be related to a shift in the immigrants' country of origin toward source countries whose migrants have historically performed more poorly in the Swedish labour market.

Understanding the connection between immigrant labour market status and their country of origin is important when examining the question of immigrant assimilation. A fall in relative earnings does not necessarily mean that the economic standing of different groups of immigrants has declined, because of probable changes in the composition of Swedish immigrants. Similarly, higher earnings for early than for recent immigrants in the cross section does not provide evidence on assimilation, since the later cohorts may increasingly consist of less skilled people (Borjas, 1985).

Results from the 1990 Census presented in Scott (1999) indicate that within country groups, the earnings of successive immigrant cohorts may not differ greatly. This finding suggests that assimilation rates are low. A more direct way to measure the extent of individual immigrant assimilation in Sweden would be to adopt the approach

taken by Ekberg (1994) and to essentially follow the same sample of immigrants through time. In his study of immigrants arriving before 1970, he used data from the Censuses and the tax registers to compute the ratio of immigrant and native earnings every five years from 1970 until 1990. The results of his study suggest that there was no change in the relative earnings of immigrants among those arriving in Sweden prior to 1970. Throughout the period covered in his study, male immigrant workers earned 98 per cent of the earnings of native males. However, over time, the proportion of immigrants who were employed decreased relative to native Swedes.

One interpretation of Ekberg's finding is that the pre-1970 immigrants were essentially assimilated when they arrived in Sweden (or were essentially assimilated by 1970) and as a result did not acquire any additional country-specific skills that raised their earnings and employment prospects relative to those of the native population. These immigrants consisted of an especially large percentage of immigrants from other Nordic countries in which the customs, language, and level of economic development were more similar to those in Sweden than is the case for immigrants from other countries.

The foregoing finding is consistent with studies of US immigration that indicate that the rate of immigrant assimilation is positively correlated with the size of the initial earnings differential between immigrants and similarly skilled natives (Duleep and Regets, 1997). Borjas (2000) observes that this positive correlation is only present when controlling for initial human capital. He finds that those with high initial earnings may in fact have faster growing earnings, and that there is no convergence between people of different national origin.

3. Factors influencing immigrant emigration

The pattern of return migration of immigrants to Sweden has been the subject of a limited number of studies. The rate of return migration is high, but this rate has probably decreased somewhat over time. Among persons in the 1970 immigrant cohort, 41 per cent left Sweden within five years; in the 1980 cohort the figure was 33 per cent (Diaconescu and Tryggveson, 1992)[1]. This change is connected with the shift from labour to refugee migration discussed above. Eco-

[1] "Within five years" in Diaconescu and Tryggveson (1992), corresponds to within six years in our study. For a comparison of emigration rates between our data and that for the total immigrant population, see Figure A2.

nomic migrants have better opportunities to return to their home country and it is thus not surprising that this group has higher emigration rates (Lundh and Ohlsson, 1994). Among economic migrants, return migration is not random. Klinthäll (1999) studied the return migration of immigrants arriving from Germany, Greece, Italy, and the US after 1968. He found that approximately 40 per cent left Sweden within five years, and that labour market success was an important determinant of return migration.

If immigrants do not randomly return to their home country or migrate to a third country, emigration may distort measures of immigrant assimilation. The literature contains several different explanations for return migration that yield different predictions about immigrant stay in the receiving country and whether high or low skilled workers are more likely to emigrate (LaLonde and Topel, 1997). One explanation parallels that of immigration: migrants return when the present discounted value of earnings in the host country is less than that in the source country. This might occur if migrants learn that they are not as productive in the host country as they had anticipated and accordingly they revise their expectations of future earnings. Alternatively, conditions in the source country might have improved, making it more attractive to return home.

Whether the unskilled or skilled are more likely to emigrate also depends on changes in the distribution of earnings in the source and receiving countries (Borjas, 1988). Market reforms in the source country that substantially increase earnings inequality would be more likely to encourage skilled rather than unskilled migrants to return home. These migrants expect greater growth in the return to their skills. Similarly, trends toward greater income equality in the host country are more likely to encourage skilled immigrants to leave.

There are other plausible economic motives for immigrants to emigrate. For example, if individuals prefer consumption including consumption of non-market time at home instead of abroad, immigrants will return home when their savings are sufficiently high (Stark, 1991). Under these circumstances, we expect that more skilled immigrants would have shorter stays in the host country than their less skilled counterparts. A related explanation holds that some immigrants arrive in the host country intending to return once they acquire skills that make them more productive back home. Once again, this explanation suggests that it is the more skilled immigrants that are the most likely to migrate.

These alternative views of the economic motivation for emigration yield different predictions about which immigrants are likely to migrate. In turn, these views also have different implications regarding the way in which emigration affects measures of assimilation. If more highly skilled immigrants tend to emigrate, the relative earnings of immigrants to natives might decline even though the least skilled immigrants assimilate rapidly. Conversely, if the least skilled immigrants migrate, the growth of immigrant relative earnings overstates the rate of assimilation, because the pool of immigrants is increasingly consisting of those individuals who were the most skilled in the first place.

4. The sample

We obtained the sample for our study from the LINDA database. It contains longitudinal information on immigrants and natives from the Swedish Censuses and from the population (RTB) and individual income registers. The resulting sample includes information on demographic characteristics, incomes, tax payments, and transfers. In addition to the information available on both the native and immigrant populations, the sample also includes information on the latest year that they immigrated to Sweden, their country of birth, and the approximate year that they emigrated from Sweden. The appendix to this study contains further details on the construction of the database and the definitions that have been used for the variables.

Our measure of the year of emigration has two principal limitations. First, we cannot distinguish between persons who left the sample because they died from those who left the sample because they emigrated. However, we present evidence below based on the emigration rates, indicating that deaths are not likely to account for the patterns of emigration that we observe in the data. Further, we show in the appendix that our emigration measure closely follows official statistics from Statistics Sweden. The second limitation is that people may not always exit registers immediately when they leave Sweden. We provide certain details on this problem in the appendix.

Our longitudinal sample is different from a number of other samples of immigrants. We do not match longitudinal data to a single cross-sectional sample of the immigrant population, which is the case in e.g. Lubotsky (2000). In this case, we would observe earnings growth only for immigrants who stay. Our sample consists instead of three per cent of the immigrant inflow from 1970 through 1990. For each of these individuals, we match longitudinal histories from immi-

gration through 1997, or until the person emigrates. Therefore, we can observe earnings growth for both stayers and emigrants.

Our sample comprises 15,574 immigrants who arrived in Sweden between 1970 and 1990. Approximately 42 per cent of the sample consists of immigrants from other Nordic countries. These immigrants are able to migrate freely without restrictions. Another 15 per cent of the sample immigrated from other OECD countries. These immigrants usually come for work-related reasons and their migration is restricted. Finally, the remaining immigrants arrive from non-OECD countries. Over time an important shift has occurred in the composition of immigrants to Sweden. In the early 1970s more than 60 per cent of immigrants arrived from other Nordic countries. But by 1990, nearly 60 per cent of immigrants were from non-OECD countries.

The first panel of Table 1 indicates that during the period covered by our study approximately 55 per cent of new immigrants were males, 52 per cent were married and their average age upon arrival was 29. These characteristics were similar among immigrant groups, although Nordic immigrants were substantially less likely to be married, and that the proportion of males was higher in the OECD group. As expected, immigrants who are likely to arrive for work-related reasons earn more and have been much less likely to receive public assistance. During their first full year (year t+1) in Sweden, the earnings of Nordic immigrants have been on average twice those of immigrants from non-OECD countries. In addition, only 17 per cent of the Nordic immigrants compared with 60 per cent of the non-OECD immigrants received social assistance during their first full year in Sweden.[2]

The shift in immigrant composition toward less skilled migrants from non-OECD countries implies that the skills of new immigrants (as measured by their earnings) declined relative to natives. As discussed above, this finding has been noted in the literature on Swedish immigration, and has been documented in other developed countries.

[2] Our sample contains individuals aged 18-55 at arrival. If a large fraction of the younger people initially entered school instead of the labour market, this could bias our results. We have therefore performed the analysis presented in the paper on a sample restricted to those above 25 years of age at immigration. All qualitative aspects of our results hold also with that restriction. We also repeated our analysis with the self-employed excluded from the sample, and received results that are very similar to the ones presented.

During the last 30 years, the ratio of new immigrant earnings to native earnings declined from .88 in 1970 to approximately .54 in 1990 and .27 by 1995. This massive decline is to a large extent driven by the high unemployment rates in the mid-1990s that especially affected the newly arrived immigrants. When we limit our earnings comparisons to persons who worked during the year, the ratio declines from .90 in 1970 to .74 in 1995.

Table 1. Group characteristics, variable means, standard deviations in parentheses

Variable	Nordic	OECD	Non-OECD	Total
Male	54.0	60.3	53.1	54.6
	49.8)	(48.9)	(49.9)	(49.8)
Age	27.6	29.2	29.6	28.7
	(8.6)	(8.1)	(8.2)	(8.4)
Married	35.4	55.0	65.5	51.7
	(47.8)	(49.8)	(47.6)	(50.0)
Earnings *t*+1	124.1	112.6	65.5	95.4
	(114.3)	(156.5)	(72.9)	(109.6)
SA receipt *t*+1	16.5	10.5	60.3	42.8
	(37.2)	(30.7)	(48.9)	(49.5)
# individuals	6,668	2,325	6,581	15,574

Notes: "Male" is the percentage of males; "Age" is age at immigration, in the sample 17<age at immigration<56; "Married" is the proportion of people who are married (of those who have civil status in the registers); "Earnings" is earnings one year after immigration, presented in 1997 SEK (thousands) adjusted by an index for all natives; SA receipt is the percentage who receive social assistance in the first year after immigration.

5. The pattern of immigrant emigration from Sweden

We start this section by describing the extent and timing of emigration among economic and political immigrants. Then we investigate how the probability to emigrate from Sweden relates to outcomes in the labour market and welfare participation.

5.1. Emigration rates for economic and political migrants

Swedish immigrants have relatively high emigration rates. Among the cohorts that immigrated to Sweden during the 21-year period between 1970 and 1990, more than one quarter left the country within five years of their arrival. During this period, this share has declined

from above one-third for cohorts arriving at the beginning of the 1970s to about one-fifth for the cohorts arriving in the late 1980s.

The decline in emigration rates is largely accounted for by the shift in the composition of immigrants away from those arriving from the Nordic countries. As indicated by Table 2, immigrants from these countries have had consistently higher emigration rates than those arriving from other source countries. Over the period studied, about 44 per cent of Nordic immigrants had left Sweden within five years of their arrival. Moreover, this fraction rose during the late 1980s.

By contrast, immigration rates are significantly lower for immigrants from non-OECD countries. Only nine per cent had emigrated within five years of their arrival, and during the period that we studied, the proportion of non-OECD immigrants who emigrated tended to fall. Therefore, in addition to the compositional change in immigrants, the declining emigration rates among immigrants from non-OECD countries also partly accounts for the downward trend in emigration rates for Swedish immigrants. This evidence indicates that political and economic immigrants face different incentives (and restrictions) to migrate.

We can follow some of the earlier immigrant arrivals in our sample for more than a quarter of a century. (Note that when studying emigration over a long time period, the inclusion of deceased in the "emigration rate" may be more problematic than when studying shorter periods.) Among persons in the early 1970s cohorts, approximately one-half emigrated within 25 years; see Figure A3 in the appendix. However, the proportion of Nordic immigrants from these cohorts who emigrated by the end of our sample frame exceeds two-thirds. The figures are well in line with the numbers for the total Swedish immigrant population presented in Diaconescu and Tryggveson (1992). Immigrants, who are likely to migrate for work-related reasons, do not tend to stay permanently in Sweden. By contrast, more than 70 per cent of the non-OECD immigrants from that period were still in Sweden, more than a quarter of a century later. This evidence also underscores the point that economic migrants to Sweden, especially those from relatively developed countries have high emigration rates, while those who are likely to migrate for political reasons and from less developed countries are much less likely to emigrate and tend to stay permanently in Sweden.

Table 2. Return migration within five years by group and cohort, percentages

Cohort	Nordic	OECD	Non-OECD	Total
70	43.1	31.2	17.9	36.1
71	44.0	36.7	18.2	36.1
72	38.3	39.6	8.7	30.8
73	38.4	38.7	11.9	30.9
74	44.5	31.6	10.5	33.9
75	40.4	26.1	10.6	30.6
76	32.9	28.9	13.0	26.3
77	38.0	32.7	12.5	28.9
78	39.1	23.4	14.6	28.0
79	44.2	28.9	9.5	30.6
80	49.4	32.3	9.2	32.2
81	52.1	36.4	10.5	31.2
82	42.3	32.1	10.2	23.2
83	44.3	41.0	10.0	29.2
84	40.8	20.4	8.6	20.9
85	41.7	18.8	7.3	18.2
86	45.3	31.0	3.6	18.3
87	44.6	32.0	5.5	19.0
88	51.2	23.9	6.0	19.9
89	50.7	25.9	6.2	22.6
90	57.4	21.1	7.9	24.6
Total	43.8	30.6	8.9	27.1

Notes: The percentage refers to individuals that are no longer on the register in their sixth year after arrival, including year of immigration.

These emigration figures are much higher than those estimated for the US. Although comparable US data are unavailable, studies estimate that between 30 to 40 per cent of immigrants to the US eventually emigrate (Warren and Peck, 1980; Borjas and Bratsberg, 1996). These emigration rates are more similar to those for Swedish immigrants from non-OECD countries, even though the proportion of US immigrants that arrive for political reasons is relatively low.

5.2. The timing of emigration

During the first year in Sweden, emigration rates are relatively low, but they rise sharply during the second and third year in the country, and then remain high for a couple of years before they decline; see

Table 3. This pattern holds both for both Nordic and OECD immigrants, but is much less apparent for immigrants from non-OECD countries. The lesson from this table is that if an immigrant is going to leave Sweden, they are highly likely to leave within a few years of their arrival. Once they have been in Sweden for five or six years, the likelihood of emigrating in any given year is relatively low. Apparently, emigration after many years in Sweden is rare.

Once immigrants have been in Sweden for a long time, the differences in emigration rates between economic and political migrants declines although they are still substantial after ten years. However, the most striking differences in emigration rates among immigrants from different source countries occur within the first five years of arrival.

5.3. Emigrants' place in the immigrant earnings distribution

In the tables below, we present figures for emigration within five or ten years after immigration together with data on initial economic outcomes in Sweden. The emphasis throughout is on the results for the five-year period. Reference to the ten-year period is made only when the results differ. Among economic migrants, those who leave Sweden tend to be less successful labour force participants than their counterparts who stay. As shown by Table 4, immigrants who emigrate within their first five years in Sweden, tend to earn less and participate less in the labour force. Although the average difference between the earnings of emigrants and stayers is positive, this result reflects the relatively high proportion of Nordic immigrants among emigrants from Sweden. As discussed above, immigrants from these countries perform better in the Swedish labour market than other immigrants. Among the population of Nordic immigrants, those who emigrated within five years of arrival earned 12 per cent (11 log points) less during their first full year in Sweden than those who stayed. We also observe a similar though smaller gap between the earnings of emigrants and stayers among the OECD immigrants. However, among the non-OECD immigrants, the difference between the earnings of emigrants and stayers is very small.

Table 3. Return migration by group, conditional probabilities, percentages

Emigration in year	Nordic	OECD	Non-OECD	Total
1	2.74	1.46	1.46	2.01
2	17.30	8.12	1.77	9.32
3	13.80	8.65	1.82	7.50
4	11.53	9.83	1.93	6.59
5	8.31	6.92	2.23	4.99
6	7.04	7.50	1.83	4.36
7	5.77	5.22	1.90	3.60
8	5.60	5.09	1.89	3.51
9	4.62	4.97	1.61	3.03
10	3.89	4.33	1.46	2.62
11	4.04	3.92	1.17	2.47
12	3.06	3.66	1.42	2.21
13	3.57	1.95	.83	1.87
14	2.33	2.37	1.10	1.62
15	1.57	2.84	1.01	1.38
16	1.89	2.47	1.57	1.67
17	2.02	1.87	1.05	1.41
18	1.40	2.24	1.07	1.24
19	1.50	1.65	.72	1.05
20	1.50	1.13	1.01	1.08
21	1.63	2.04	1.22	1.34
22	1.51	2.09	1.04	1.23
23	.80	1.47	.50	.69
24	1.05	1.39	.85	.89
25	2.98	.60	1.62	1.72
26	2.22	4.01	.36	1.54
27	1.11	.00	.00	.45

Notes: Table shows conditional emigration probabilities. Formally: Pr (Emigration in year X | Stay to X).

Table 4. Labour market outcomes for stayers and emigrants in the first full year in Sweden, immigration year+1, emigration within five or ten years

	Earnings>0, perc.		ln(Earnings)	
	Stayed	Emigr.	Stayed	Emigr.
Within five years				
Nordic	86.2	77.8	4.76	4.65
	(34.5)	(41.6)	(.87)	(1.03)
OECD	79.4	64.4	4.54	4.48
	(40.4)	(47.9)	(1.04)	(1.54)
Non-OECD	74.7	57.2	4.06	4.04
	(43.5)	(49.5)	(1.18)	(1.27)
Total	79.2	72.0	4.38	4.54
	(40.6)	(44.9)	(1.11)	(1.18)
Within ten years				
Nordic	86.6	78.6	4.78	4.66
	(34.1)	(41.0)	(.82)	(1.00)
OECD	81.5	66.1	4.55	4.46
	(38.8)	(47.4)	(.98)	(1.39)
Non-OECD	78.9	64.4	4.15	4.11
	(40.8)	(47.9)	(1.10)	(1.25)
Total	81.9	73.4	4.43	4.54
	(38.5)	(44.2)	(1.03)	(1.14)

Notes: "Earnings>0" shows percentages with positive earnings; ln(earnings) is the mean of log earnings, standard deviations in parentheses. Measures in t+1, conditional on staying to t+2.

Even more striking differences between emigrants and stayers are shown by the percentage figures for employment earnings for those who worked during their first full year in Sweden. Among the immigrant groups studied, the percentage of emigrants who worked after arriving in Sweden is 8 to 18 percentage points lower than the corresponding percentages for the stayers. This evidence indicates that immigrants who emigrate are substantially less attached to the Swedish workforce. This evidence works against the contention that the Swedish welfare state tends to retain less successful immigrants, and at the same time encourages more economically productive immigrants to leave. At least among likely economic immigrants, those most likely to leave Sweden are those who are least likely to find work and when they do work, those who are relatively low paid.

To see how immigrants' earnings during their first years in Sweden are associated with subsequent emigration, we estimate a linear probability model in which the dependent variable is whether the individual emigrated within five (ten) years of arrival. We controlled for immigrants' gender, age (and its square), the region of origin, year of arrival, and interactions between year of arrival and region of origin. Our measures of earnings are (i) log earnings and (ii) earnings during an individual's first full year in Sweden.

We find that among immigrants who worked during their first full year in Sweden and did not migrate at least until their second year in the country, earnings during that first year is negatively associated with the probability of emigrating. However as summarised by Table 5, the magnitude of this relation is relatively small. The coefficient of -.017 implies that a doubling of earnings (which is about one standard deviation of the mean level of immigrant earnings among those who work) is associated with less than a 2 percentage points decline in emigration probabilities. Given that on average, approximately 25 per cent of immigrants leave within 5 years, this estimate is not especially large. The elasticity of emigration with respect to earnings is about .07. The effect in the ten-year model is slightly larger; the point estimate of -.030 implies an elasticity of about .08.

The figures above summarise the relationship between emigration and earnings among individuals who worked during their first full year in Sweden. However, the likelihood that immigrants have employment earnings during this year is more closely related to the probability of emigration. The percentage emigrating within the first 5 years of arrival was almost 11 percentage points lower among immigrants who worked for pay compared to immigrants who did not work during their first full year in Sweden. The percentage of immigrants who worked for pay during their first full year in Sweden and left the country within the first 10 years in the country was 16 percentage points lower compared to those who did not work. These findings underscore our point that emigration is associated with a lack of labour force attachment. This appears to be the primary mechanism through which lower earnings are associated with increased emigration rates.[3]

[3] Slightly modified versions of Table 5 indicate that holding initial earnings constant, there are substantial differences in emigration rates between groups. For example, non-OECD migrants were about 22 per cent less likely than Nordic immigrants to emigrate within five years of arrival. We have also performed the estimations of

Table 5. Probability of emigrating within five or ten years, linear probability

	Five years		Ten years	
	(1)	(2)	(3)	(4)
ln(Earnings)	-.017 (.003)		-.030 (.005)	
Earnings*10^{-3}		.051 (.034)		-.0023 (.049)
Earnings>0		-.111 (.009)		-.157 (.012)
Male	.057 (.007)	.046 (.006)	.082 (.010)	.077 (.009)
Age	.003 (.003)	.003 (.003)	.000 (.004)	.000 (.003)
Age squared *10^{-3}	-.060 (.044)	-.063 (.037)	-.012 (.060)	-.024 (.052)
N	10,779	13,838	8,477	10,701
Adjusted R^2	.10	.11	.12	.13

Notes: OLS parameter estimates, standard errors in parentheses. Dependent variable=1 if individual emigrated within five (ten) years. Outcomes in immigration year +1. Real income-adjusted earnings in 1997 SEK (thousands). "Earnings>0" is a dummy variable for having earnings. Also included: Controls for immigration year, country of origin group and interactions group*im year. Sample for outcomes in year t+1 conditional on staying at least to t+2.

5.4. Emigration and the welfare system

Immigrant earnings patterns indicate that once we account for an immigrant's region of origin, those who are more skilled and more attached to the workforce are more likely to remain in Sweden. This finding suggests that immigrants who stay are less likely to be a burden on the social welfare system than immigrants who migrate. The LINDA database allows us to explore this question because it includes information on annual payments for social assistance and for study allowances.

Table 6 shows that immigrants who migrated within the first five years of arrival were less likely to receive social assistance during their first full year in Sweden. Furthermore, when they did receive such aid

Table 5 separately by gender. The results indicate that the effect of employment on the emigration probability is stronger among males than females. The 5-year estimate is -.138 for males and -.052 for females.

they tended to receive less of it than their counterparts who stayed. Among those who emigrated, the percentage that received social assistance during their first full year in the country was about one-half of the corresponding percentage for immigrants who stayed. Further, among those emigrants who received public assistance during that year, the mean duration was 32 per cent lower among emigrants.[4] For emigration within ten years, the differences are somewhat smaller, but nevertheless substantial.

The main reason that emigrants were less likely to have received public assistance is that they consist of a larger proportion of Nordic and other OECD immigrants than do the stayers. Among Nordic immigrants, a slightly higher proportion of emigrants than stayers received public assistance during their first full year in Sweden. The number of months as a recipient is also somewhat larger, especially over a ten-year period. Among the other OECD immigrants, rates of social assistance are even lower. However it seems that stayers are somewhat more likely to receive benefits. Moreover when they do, they receive benefits for a longer period of time.

Immigrants from non-OECD countries have by far the highest proportion of individuals receiving social assistance. Moreover, non-OECD immigrants who stay in Sweden are more likely to have received social assistance during their first full year in the country. Moreover they are also likely to have received such aid over a longer time period. This finding may be of concern to policy makers because the composition of Swedish immigration shifted during the latter part of the 20th century toward immigrants from these countries.[5]

[4] Months of receipt is preferred as a measure of the level of social assistance dependence because the amount received depends on the size of the household.

[5] The relation between earnings and emigration appears not to be in accordance with the results for social assistance. One possible explanation to this is that social assistance is a household-based benefit. If stayers live in larger households, individuals may earn more and still be eligible for social assistance. The fact that 54 per cent of stayers but only 36 per cent of emigrants were married in their first year in Sweden (a pattern that holds also within groups) is consistent with this explanation. However, the patterns of Table 6 hold also when it is calculated for the unmarried and the married separately. Furthermore, regressions similar to those in Table 5, but with social assistance receipt instead of earnings and employment, show the same pattern as Table 6: a significantly negative correlation between receipt and emigration among non-OECD immigrants, and statistically weaker associations within the other groups.

Table 6. Social assistance in first full year in Sweden, *t*+1

	Within 5 years		Within 10 years	
	Stayed	**Emigrated**	**Stayed**	**Emigrated**
Nordic				
Reception, perc.	16.1	17.4	16.9	19.5
$\text{Months}\|_{\text{recep.}}$	3.9	4.3	3.9	5.4
# individuals	1,059	562	439	385
OECD				
Reception, perc.	11.0	8.8	12.6	8.1
$\text{Months}\|_{\text{recep.}}$	3.7	2.6	3.9	3.9
# individuals	648	171	301	186
Non-OECD				
Percentage receiving social assistance	61.2	43.9	61.5	53.1
$\text{Months}\|_{\text{recep.}}$	7.9	6.7	7.9	7.6
# individuals	3,735	187	1,701	213
Total				
Percentage receiving social assistance	46.4	21.2	47.4	25.9
$\text{Months}\|_{\text{recep.}}$	7.6	5.2	7.6	6.7
# individuals	5,442	920	2,441	784

Notes: Percentage receiving social assistance is the percentage with amount>0; "Months" is the average number of months of social assistance received. Data on social assistance available from 1983.

Immigrants to Sweden are not automatically eligible for study allowances. The general rule is that the person must have come to the country with another purpose than to study. Refugees are generally eligible for allowances, and other immigrants qualify by living and working in Sweden for a minimum of two years.[6] Thus, there are ways of coming to Sweden, staying for a limited period, receiving an education, and then returning. Because the initial receipt of study allowances may not be the appropriate measure to study, we also use

[6] According to the rules, being unemployed, in a labour market programme, or taking care of own child or other close relative is equivalent to working.

data on the receipt of study allowances during later years in Sweden. The information contained in the database on study allowances reveals a somewhat similar pattern to that of social assistance. However it should be interpreted differently. As shown by Table 7, immigrants from the non-OECD countries are more likely than immigrants from other countries to receive such allowances. Further, those who stay in Sweden are more likely to receive allowances than those who emigrate.[7] This latter finding also holds for Nordic and other OECD immigrants. For both groups, those who stay received more study allowances during their first full year in Sweden than those immigrants who eventually migrated.

Table 7. Receipt of study allowances

	Within 5 years		Within 10 years	
	Stayed	**Emigrated**	**Stayed**	**Emigrated**
Nordic				
t+1	1.5	.7	2.5	1.3
t+3	3.8	3.3	5.0	3.3
t+7			4.6	3.3
OECD				
t+1	2.3	.0	2.3	1.1
t+3	6.3	.0	5.0	3.8
t+7			5.6	.0
Non-OECD				
t+1	7.6	4.3	9.1	7.5
t+3	11.8	6.0	13.0	13.2
t+7			7.6	12.3
Total				
t+1	5.8	1.3	7.1	2.9
t+3	9.6	3.4	10.6	6.8
t+7			6.8	6.6

Notes: Percentage of the group receiving study allowances in year t+x. Data on study allowances available from 1983.

By contrast, to the findings on the receipt of social assistance by immigrants, the figures on the receipt of study allowances may be more encouraging to policy makers. Immigrants from all groups who

[7] Except for emigration within 10 years in the non-OECD group in *t*+3 and *t*+7.

received such allowances after their arrival have been much more likely to stay in the country for at least ten years. This behaviour suggests that these allowances might constitute a productive social investment in immigrants. As a group, immigrants do not use these allowances to enhance their skills and then migrate back to their home countries where they then realise the returns on Sweden's investment in their skills. The data indicates that immigrants who receive a study allowance after arrival in Sweden are signalling that they are likely to remain in the country for many years.

6. Emigration's effects on measures of assimilation

What are the implications of this pattern of emigration for measures of assimilation? Regarding the immigrant group as a whole, those who stay are less skilled than the immigrants who leave. This skill difference arises in Sweden because individuals from countries whose immigrants have high earnings tend to emigrate, whereas those from countries whose immigrants have low earnings tend to stay. This pattern occurs because immigrants who have low earnings tend to be from countries that send political migrants. As we observed above, even if we account for initial labour market success in Sweden, immigrants from such countries are less likely to emigrate.

However, when we examine the relationship between labour market success and subsequent emigration rates among economic and political migrants, we find that it is the less skilled or less successful who appear to leave. This means that the implications of emigration for measures of assimilation are likely to be different when studying the whole immigrant population than when studying economic and political migrants separately.

In the literature, there are at least two ways to define whether assimilation has occurred. First, over time do the earnings of immigrants "catch up" with the typical native? Second, do immigrants acquire country-specific human capital that leads to higher earnings? The concepts of assimilation underlying these two questions differ as do the estimates that they generate, especially in recent years when the new immigrants became markedly more economically disadvantaged relative to their native counterparts.

To answer the first question on assimilation, we can simply compare the earnings of the native population with those of immigrants to see whether, and possibly when, immigrants reach the same earnings levels as the native population. If age-earnings profiles and skill

premiums differ between natives and immigrants, we cannot answer the second question by relating immigrants to natives. Alternative comparisons used in the literature include natives of the same ethnicity as immigrants, or immigrants of the same ethnicity who have been in the host country for many years (Borjas, 1985; LaLonde and Topel, 1992). The idea here is that this comparison group shares some of the characteristics with more recent immigrants, but is fully assimilated, even though it has not caught up with the average native. Below we consider the second of these two options when computing measures of immigrant assimilation.

6.1. Results from the 1996 cross section

To show how computations from the Swedish data compare to those reported in the literature, we begin by adopting a variant of the approach used by Chiswick (1978). Chiswick measured assimilation using cross-sectional data from the 1970 US Census. He compared the 1969 earnings of comparably skilled immigrants who had spent differing amounts of time in the US. In the Swedish context, we estimate the parameters of the following model of immigrant earnings:

$$y_i = \alpha + \beta' \mathrm{X}_i + \delta' \mathrm{IMM}_i + \varepsilon_i \qquad (1)$$

where y_i denotes (the log of) earnings in 1996, the last year covered in our sampling frame, X_i denotes age and age squared, and IMM_i denotes a vector of dummy variables indicating the number of years since migration. The categories we consider are 1 to 5 years, 6 to 10 years, 11 to 15 years, 16 to 20 years, and more than 20 years, which is the reference category in the analysis. We estimate this relationship both in aggregate terms, and separately by region of origin and gender "cells" for all immigrants who arrived prior to 1996 and were still in Sweden in 1997.

It is well known that this approach will suffer from bias if there are changes in cohort quality, or if there is non-random emigration of immigrants. The results of the first panel of Table 8 suggest that among economic migrants, earnings do not rise significantly with time in Sweden. With the exception of Nordic women, the earnings of new immigrants to Sweden are not significantly lower than are those of comparably aged immigrants who had been in Sweden for more than 20 years. For immigrants from Nordic or other OECD coun-

tries, there is little systematic evidence of immigrant assimilation in the cross section. This finding indicates that the actual assimilation rate must be even smaller than suggested by the table, because the emigration patterns discussed in the previous section imply that any measure of assimilation derived from cross-sectional data is upwardly biased (Borjas, 1985; Jasson and Rosenzweig, 1990).

By contrast, among non-OECD immigrants who more likely migrated for political reasons, the pattern from the 1996 cross section suggests rapid assimilation in the sense that these immigrants are acquiring country-specific human capital. The longer immigrants from these regions of the world have been in Sweden the higher are their earnings.[8]

Part of the sharp rise in relative earnings of new non-OECD immigrants may be due to increases in weeks or hours worked, instead of due to increased wages. Even though we do not have wage data, we explore this possibility by comparing the relative earnings of immigrants from different entry cohorts whose 1996 earnings were above 36,200 SEK.[9] As shown by panel B of Table 8, estimates based on our crude proxy for wages do reveal a more attenuated relation between earnings and time in Sweden. This finding underscores the importance of labour force participation rates as indicators of success in the Swedish labour market. Nonetheless, among non-OECD immigrants who work regularly, it is still the case that 20 years in Sweden is associated with significantly higher earnings. The pattern is similar to that reported for relatively unskilled immigrants to the US (LaLonde and Topel, 1992; Duleep and Regets, 1997). By contrast, in Panel B we continue to find scant evidence in the cross section of assimilation among the economic migrants to Sweden.

[8] Table A.2. shows results from some variations on these estimations. As evident from Panel A, it appears as if no group reaches native earnings levels even after more than twenty years in Sweden. Further, Panel B shows that including additional control variables does not alter the results substantially. A comparison between A and B also reveals that the estimates on assimilation are very much alike using the two different reference groups.

[9] In 1996, this was the level of the "base amount", which determines e.g. eligibility for social assistance.

Table 8. Earnings assimilation, cross-sectional estimates 1996

Time since im.	1-5	6-10	11-15	16-20	N	Adj R^2
Panel A:						
All	-.989 (.035)	-.487 (.033)	-.361 (.039)	-.209 (.035)	15,690	.16
Nordic	-.188 (.073)	-.090 (.060)	-.112 (.070)	-.077 (.048)	5,947	.05
OECD	-.049 (.105)	-.065 (.103)	-.172 (.108)	-.129 (.100)	1,927	.08
Non-OECD	-1.129 (.052)	-.521 (.050)	-.372 (.058)	-.261 (.056	7,816	.17
Nordic (male)	-.066 (.110)	-.080 (.094)	-.144 (.111)	-.162 (.075)	2,688	.04
Nordic(female)	-.298 (.095)	-.090 (.078)	-.072 (.089)	.000 (.061)	3,259	.06
OECD (male)	-.206 (.130)	-.163 (.129)	-.361 (.141)	-.312 (.130)	1,180	.10
OECD(female)	.171 (.179)	.051 (.168)	.115 (.168)	.141 (.153)	747	.05
Non-OECD (male)	-.994 (.080)	-.592 (.074)	-.431 (.087)	-.297 (.084)	3,833	.15
Non-OECD (female)	-1.223 (.067)	-.449 (.067)	-.307 (.077)	-.224 (.075)	3,983	.19
Panel B:						
Nordic (male)	.078 (.052)	-.031 (.043)	.028 (.053)	-.063 (.034)	2,404	.04
Nordic (female)	.003 (.044)	.040 (.034)	-.010 (.038)	.026 (.026)	2,889	.05
OECD (male)	.024 (.065)	-.061 (.062)	-.023 (.070)	-.150 (.063)	1,007	.08
OECD (female)	.008 (.083)	.086 (.077)	-.094 (.074)	-.004 (.067)	623	.03
Non-OECD (male)	-.330 (.038)	-.216 (.033)	-.160 (.038)	-.195 (.036)	2,745	.11
Non-OECD (female)	-.368 (.034)	-.180 (.029)	-.121 (.033)	-.107 (.032)	2,473	.13

Notes: OLS parameter estimates (standard errors in parentheses) from estimation of log earnings 1996 on age and its square, and dummies for time since immigration 1-5, 6-10, 11-15, and 16-20 years respectively. Reference group: more than 20 years since immigration. Sample conditional on being in Sweden in 1997, 1996 immigrants excluded. 17<Age<65. Panel B also conditions on earnings being larger than one basic amount (SEK 36,200 in 1996).

6.2. Evidence from the 1970-1997 longitudinal data

In this section, we focus on how emigration affects measures of assimilation, and to what extent immigrants' earnings converge with those of natives. As indicated above, cross-sectional based measures of assimilation can be misleading if there has been a decline in immigrant "skills" over time, or there are high rates of emigration by less skilled immigrants. The figures in Table 8 account for the dramatic changes in the region of origin of Swedish immigrants. Hence, to some extent, our cross-sectional analysis accounts for this source of change in immigrant "quality". Further, our earlier analysis showing that non-OECD immigrants are not likely to emigrate suggests that the above cross-sectional measures of assimilation are not distorted for this immigrant group. There may, however, have been changes in the within-group compositions that bias our results. Our longitudinal data allow us to explore these issues in greater depth.

We turn to comparing the earnings growth of different immigrant groups during their first 10 years in Sweden to the average earnings growth of natives. This measure considers whether immigrants move upwards in the earnings distribution, and thereby if average immigrant earnings converge to those of natives. We want to base the comparison on two measures that differ *only* because of emigration. Our measure that does not control for emigration uses the difference in average earnings between times t and t–1, where t denotes time since arrival in Sweden. The measure that controls for emigration uses the difference in average earnings for individuals observed both in t and t–1. Since the second measure is based only on observed changes in earnings, it accounts for the selection of emigrants in terms of earnings levels.[10]

The upper panel of Table 9 summarises the results when we do not control for emigration. According to these figures, immigrant earnings grew by on average 20' SEK during their first ten years in Sweden.[11] Given that immigrant earnings during their first full year in

[10] Selection may also be on earnings growth; i.e. the potential growth between t and t-1 could be different among those who emigrate between the two years than those who are observed in both years. The statistical analysis becomes much more complicated in this case, but it is indeed an interesting and important question for additional research.

[11] Note two things about the results. The earnings measure is indexed with the average native earnings level in each calendar year; thus, a positive number in Table 9

Sweden averaged 95' SEK, this growth constitutes substantial convergence. Furthermore, it appears that there is also convergence among economic migrants, who have relatively high initial earnings.

The above estimate of the rate of convergence of immigrant earnings to native earnings may be misleading because less successful immigrants emigrate during their first 10 years in Sweden. These emigrants have lower earnings, and when they emigrate, the average earnings of remaining immigrants will increase even when individual earnings do not change.

To account for this potential source of bias in our estimates, we compute the difference between the mean relative earnings of immigrants in two successive years, excluding from the sample persons who had emigrated during the most recent year. In this way we only base our measures of convergence for immigrant earnings to observed changes between *t* and *t*-1. The emigrants leave the sample and are not used in the calculation when they emigrate. Prior to that point, their earnings growth figures in our computation of earnings convergence.

We perform a similar calculation for each year starting with the year following the year of arrival, and finally estimate the total earnings growth as the sum of our measures of annual earnings growth. This method adjusts for emigration and the possibility that emigrant relative earnings were lower to begin with (in year *t*) compared to those of other immigrants, because we ensure that our measure of year-to-year growth includes the same individuals.[12]

This method of accounting for emigration reveals that the earnings growth of Nordic and other OECD immigrants is slight. As shown by the lower panel of Table 9, the cumulative earnings growth of Nordic immigrants relative to natives during their first ten years in

indicates an increase relative to natives. Also, the averages are calculated only on individuals potentially observed in both *t* and *t*-1.

[12] Note two things about this comparison of assimilation measures. First, our measure that does not control for emigration is the difference in plain means of observed earnings in *t* and *t*-1. If emigrants' low earnings can be explained by observable characteristics, a measure of assimilation that controls for these characteristics may not suffer from emigration bias. However, if we adjust the earnings measure for individual characteristics (gender, age, age squared, marital status, immigration year), the results are very similar to those presented in Table 9. The second thing to note is that we label all of the earnings growth relative to the native mean assimilation; we do not attempt to separate out the effect of ageing that would occur also in the absence of economic assimilation.

Sweden is only 2,600 SEK (about 2 per cent). For OECD migrants we even estimate negative assimilation over the period.[13] The faster growth rate that we find when we do not account for emigration is a result of low-earning Nordic and other OECD immigrants leaving Sweden at higher rates than their high-earning counterparts.

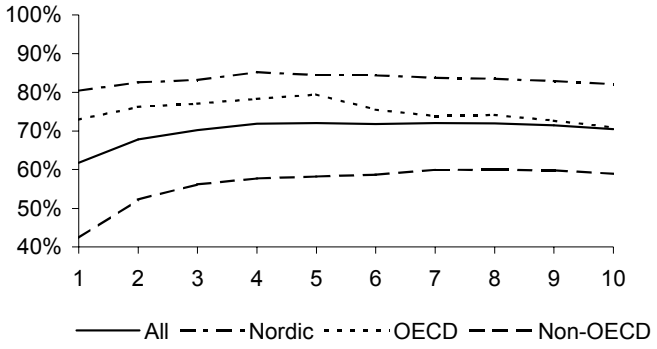
By contrast, although emigration accounts for some of the relative growth in earnings of non-OECD immigrants compared to natives, there is still substantial evidence of earnings convergence. Indeed, as shown by Figure 1, most of this convergence occurs during the first three to four years after non-OECD immigrants arrive in Sweden.[14] This evidence indicates unconditional convergence: the group that has low initial earnings increases their earnings relative to other immigrants and natives, regardless of initial human capital. As discussed above, Borjas (2000) states that research on US immigration only shows this type of convergence when human capital is held constant.

The Nordic and OECD immigrants start with relatively high earnings, but experience little earnings growth relative to natives. Moreover, they never "catch up" with natives. Neither the cross-sectional nor the longitudinal analyses indicate that these particular economic immigrants acquire country-specific skills that cause their earnings to grow relative to either natives or their counterparts who arrived years earlier. This evidence may suggest that these immigrants have arrived in Sweden with sufficient knowledge of the country's culture and institutions to take full advantage of their skills.

[13] Both these changes are, however, statistically insignificant.

[14] The patterns of assimilation seem to be stable over time. For example, when we split the sample according to immigration before and after 1980, we get very similar results as in the overall sample.

Figure 1. Convergence to natives' earnings, control for emigration



Source: Table 9, control for emigration. Average immigrant earnings as percentage of natives'. The numbers on the x-axis denote years since immigration.

By contrast, non-OECD immigrants start with low earnings, but experience more rapid relative earnings growth. This growth may result from these immigrants acquiring country specific skills that raise their earnings. Despite the growth, this group's earnings remain far behind both their OECD counterparts and natives.[15] Furthermore, the growth slows dramatically after only a few years in Sweden, and immigrants who spent ten years in Sweden do not have higher earnings than those who have only been in the country for five years. This contradicts the cross section results, which indicated that earnings continue to grow for 15 and even 20 years after arrival. Emigration rates are so low that they do not cause this discrepancy; instead, the difference may stem from within group changes in cohort quality that bias the results from the cross section.

[15] The cross section estimates reported in Table A.2. suggest that the remaining earnings gap is not due to differences in levels of education.

Table 9. Income assimilation, with and without control for emigration

Average earnings in first full year (adjusted thousands 1997 SEK)				
	All	**Nordic**	**OECD**	**Non-OECD**
	95.37	124.13	112.59	65.46
	(109.58)	(114.27)	(156.45)	(72.94)
No control for emigration				
Year	**All**	**Nordic**	**OECD**	**Non-OECD**
2	8.972	6.128	5.018	15.640
3	3.807	2.985	3.189	6.717
4	2.963	5.431	.280	3.357
5	1.008	.560	4.523	1.464
6	.812	2.385	-2.851	1.559
7	1.569	.235	1.634	2.970
8	.794	.172	3.908	.780
9	.501	.828	.046	.722
10	-.618	-.146	-.104	-.770
Sum	19.807	18.579	15.642	32.439
Control for emigration				
Year	**All**	**Nordic**	**OECD**	**Non-OECD**
2	9.364	3.288	5.094	15.167
3	3.631	.976	1.247	6.078
4	2.592	3.140	1.969	2.416
5	.278	-1.107	1.694	.740
6	-.457	-.152	-6.033	.735
7	.415	-.961	-2.533	1.956
8	-.142	-.497	.459	-.080
9	-.694	-.814	-2.361	-.156
10	-1.491	-1.249	-2.648	-1.331
Sum	13.496	2.624	-3.112	25.527

Notes: Figures for real income adjusted in terms of thousands 1997 SEK. The table shows earnings differences between the previous and the present year. No control for emigration shows differences in averages over individuals. Control for emigration shows averages of individual differences. Non-earners included. In the panels, 1 means a 1000 SEK earnings increase relative to average native earnings.

7. Conclusions

During the last 30 years, the earnings of immigrants to Sweden relative to those of the native population have declined. This decline results primarily from a change in the composition of new immigrant cohorts away from economic migrants from the Nordic countries and toward migrants from non-OECD countries. Immigrants from these countries earn less, are less likely to be employed upon arrival in Sweden, and receive more social assistance than other immigrant groups. Furthermore, even many years after their arrival, they still are economically disadvantaged both compared to other immigrant groups and to natives. Accordingly, the shift in immigrant composition toward political migrants from non-OECD countries indicates that the disparity in material welfare between the immigrant and native population will be larger in the future than it has been in the past.

Our study indicates that immigrants assimilate partially in the sense that their earnings grow relative to their native counterparts, but they do not catch up. Nordic immigrants are the most advantaged immigrant group. However even after 10 years in Sweden, they still earn approximately 15 to 20 per cent less than the average native Swede. The earnings of economic migrants converge very little with those of the native population after arrival. Non-OECD immigrants start out with a much greater earnings disadvantage. Their earnings converge more rapidly during their first five years in Sweden, but beyond this point we find little evidence of continued convergence. Accordingly we view the ten-year disparity as permanent. In the long-term they end up earning about 40 per cent less than then their native counterparts.

Correspondingly, some US studies find that immigrants from Mexico and East Asia experience lower earnings upon arrival to the US than do immigrants from Western Europe, but in subsequent years their earnings grow more rapidly relative to similarly skilled natives. "Similarly skilled" is an important condition here; some results indicate that without controls for initial human capital, the earnings of different immigrant groups may actually diverge with time in the US.

Measures of immigrant assimilation in Sweden are affected both by changes in the composition of immigrants and emigration patterns. In the cross section, the relationship between time in Sweden and relative earnings appears steeper than it actually is because the new immigrants tend to be low-paid arrivals from non-OECD countries while the earlier immigrants tend to be more successful migrants from the

Nordic countries. To some extent, this misleading impression of the speed of immigrant assimilation can be explained with reference to the relationship between time in Sweden and relative earnings for immigrants from different regions of origin, or more precisely a separate study of potential economic and political migrants. However, the disparity between our findings in the cross section and in the longitudinal data suggests that within the group of non-OECD migrants, labour market performance has deteriorated in the later cohorts. In a future paper we could examine this hypothesis by comparing new immigrant earnings with those of natives.

Immigrant emigration does affect measures of assimilation for immigrants from Nordic and other OECD countries. Emigration rates for these immigrants are substantially higher than for potential political migrants from non-OECD countries. Further, among the likely economic migrants, most of the emigration occurs within the first five years after arrival. Within this group of immigrants, we find that it is the least economically successful immigrants who migrate. Initial attachment to the labour force rather than the earnings of those who have employment provides us with a better prediction of those who are likely to emigrate within five or ten years of arrival.

Accordingly, despite Sweden having a narrower distribution of earnings and more generous social welfare system than does the US or many other OECD countries, it is still the most economically successful immigrants within each group who stay. The implication of this pattern of emigration is that conventional measures of immigrant assimilation overstate the true rate of assimilation. Taking account of emigration reduces the amount of earnings convergence for Nordic immigrants by as much as 86 per cent and for OECD immigrants by more than 100 per cent.

By contrast, immigrant emigration has less effect on measures of assimilation for immigrants from non-OECD countries. Emigration rates for these immigrants are relatively low, especially during the first five years after arrival, compared with other Swedish immigrants. Although emigration cannot markedly affect this group's assimilation, it is still the case that the most economically successful non-OECD immigrants stay while the least successful leave again. We find that those most attached to the labour force when they first arrive in Sweden are the most likely to stay. However, because emigration rates are so low, these findings imply that conventional measures of assimila-

tion are somewhat upwardly biased, although not by much compared to comparable measures for the OECD immigrants.

It is not surprising that we find large differences in emigration rates between economic and political migrants. This disparity is especially large over the first five years in Sweden when the percentage of non-OECD immigrants who emigrate is more than 20 percentage points less than the percentage of Nordic immigrants with comparable labour market status. The difference between the free migration of Nordic immigrants and the risks and costs political migrants face in considering emigration, illustrates that the most important factor determining emigration within the whole group of immigrants is not labour market outcome, but rather whether one is an economic or political migrant.

Nevertheless, within these different groups of immigrants, economic outcomes play a role in determining who leaves and who stays. Since it appears to be the less successful who leave, measures of assimilation that do not account for emigration will overstate the true degree of earnings convergence that occurs after immigration.

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Appendix

This appendix describes the data used in the study. First, we outline the sample selection process, and then we describe the variables included in the data and their properties. The data employed in the study are drawn from the population sample of the LINDA database, which contains a three per cent cross-sectionally representative sample of the Swedish population. For details, see Edin and Fredriksson (2000).

A.1. Immigration and emigration

For the age range of interest, the LINDA sampling frame includes every person who lived in Sweden during a particular year. [16] An immigrant to Sweden enters the national registration (and thus the sampling frame) when he or she receives a residence permit. This means that asylum seekers awaiting decisions on their applications are not included in our sample, but that anyone who receives a residence permit can be included; no matter how long the individual remains in Sweden afterwards.

Immigrants entering Sweden during the period 1970-1990 are identified, and can then potentially be followed through 1997. Immigration is defined in the following way:

- 1970: Year of immigration set to 1970 in the 1970 census.
- 1971-1981: Non-Swedish born individuals who are in data year *t* but not in year *t*-1 receive immigration year *t*. (No variable for immigration year available for this period).
- 1982-1990: Year of immigration is set at *t* in the LINDA register.

Individuals who leave the registers are identified as emigrants. This means that we are not able to distinguish actual emigration from death, which are the two only ways a person can leave the registers. To mitigate this problem and to include only working-age people, we include in the empirical analysis only individuals aged between 18-55 at the time of immigration. Another problem is that people may have left the country before they leave the registers. The extent of this

[16] Before 1991, individuals aged 0-15 who died or emigrated during one year were not included in the sampling procedure for that year. Since we include only people in ages 18-55 at immigration, this is not a problem for our study.

problem is unfortunately somewhat unclear. In relation to the 1985 census, it was estimated that 1 per cent of Nordic immigrants, and 2.8 per cent of other immigrants, in the registers were not in the country (Diaconescu and Tryggveson, 1992). Note also that our definition of immigration and emigration allows for multiple entries and exits.

With this observation time span, we can identify immigration after seven years at the shortest, and 27 years at the longest.[17] For some applications we therefore exclude immigrant cohorts that we cannot follow long enough. Furthermore, when relating e.g. earnings in year t+1 to emigration in t+5, we must assume that the individual stays to t+2, so that the person lived in Sweden during the full year when we measure earnings. If this did not hold, the earnings measure for people leaving Sweden would be downward biased.

A.2. Country of origin groups

To investigate the possibility that behaviour differs across immigrants with different backgrounds, we have made the following division into groups based on country of birth:

- Nordic—Immigrants from the Nordic countries (Norway, Denmark, Finland, Iceland).
- OECD—Countries (except Nordic) that were members of the OECD in 1985 (excludes former Eastern European countries and Mexico). Exceptions: Turkey excluded, a number of small Western European countries included (Andorra, Cyprus, Malta, Monaco, Liechtenstein, San Marino, The Vatican).
- Non-OECD—Countries not included in any of the above groups.

Since 1954, there has been a common Nordic labour market, with free migration and rights for every Nordic citizen to receive social benefits in any Nordic country. Immigration from this group of countries, especially Finland, has always constituted a large fraction of the total immigration to Sweden. The reason for the division of the rest of the countries is that we want to identify immigrants who are likely to be refugees. There is no information on refugee status in the registers, and although of course not perfect, we believe that this criterion for grouping countries is reasonable.

[17] This includes the immigration year. Any person still in the registers in 1997 is not defined as an emigrant; therefore, the maximum stay before emigration is 1970-1996.

The procedures for identifying immigrant cohorts described above provides us with a sample that has the size and properties shown in Tables 1 and A1. It is clear that immigration from the Nordic group dominated in the beginning of the 1970s, and has then decreased somewhat sluggishly. The inflow from other OECD countries has been fairly constant, with a small downturn during the last two years of the 1970s and the beginning of the 1980s. Non-OECD immigration increased only slightly over the period until 1985; after that year, it more than doubled within a few years.

Table A.1. Cohort sizes by group

Cohort	Nordic	OECD	Non-OECD	Total
70	591	128	195	914
71	418	199	192	809
72	243	111	126	480
73	219	119	135	473
74	427	133	181	741
75	492	142	208	842
76	511	121	277	909
77	410	113	255	778
78	330	77	246	653
79	405	97	253	755
80	350	93	262	705
81	219	99	247	565
82	149	81	274	504
83	167	78	180	425
84	152	93	243	488
85	108	48	234	390
86	203	116	473	792
87	224	128	546	898
88	248	113	596	957
89	438	108	772	1,318
90	364	128	686	1,178
Total	6,668	2,325	6,581	15,574

Note: Sample sizes for immigrant cohorts, restricted to 17<age at immigration<56.

A.3. Supplementary sample—cross section 1996

For some purposes, we use a sample of the cross section in 1996. This includes immigrants ages 18-64 in the LINDA population sample who immigrated in 1995 at the latest, and were still in Sweden in

1997; the number of immigrants in the sample is 15,690. In some instances, we also include a subsample of natives from the LINDA population sample cross section of 1996 as reference category.

A.4. Variables

Gender and age are available in the registers for the whole period; we measure age at time of immigration. Table 1 in the main text shows that males are somewhat overrepresented, especially in the OECD group. Average age at immigration is about 29 for the whole sample, and approximately two years lower in the Nordic group compared to the two others.

A.4.1. Earnings

The earnings variable used in the study is calculated from tax registers. Due to changes in the tax and benefit systems over the years, it is not possible to get a perfectly matched variable for the whole period. From 1978 onwards, there are predefined variables for labour income. These variables include the sum of wage and self-employment earnings, minus transfers that are not direct compensation for absence from work (i.e. sickness assistance is included while unemployment insurance is not). For years prior to 1978, we use the sum of wage and self-employment earnings.

To get measures that are comparable over time, we adjust for overall real earnings growth. This is achieved with the aid of an index for mean earnings of natives in the LINDA sample in each calendar year. In the regressions, we adjust by an index for natives' earnings conditional on earnings larger than zero; in the assimilation calculations, we also include immigrants with zero earnings, and adjust accordingly using an index for all natives, including non-earners. Note that these adjustments capture both changes in actual real earnings, and changes in the construction of the variable. For our purposes, this is desirable. All earnings figures presented are in adjusted thousands 1997 SEK.

A.4.2. Self-employment

Earnings from self-employment can be identified separately in the data. The tax register classifies earnings as coming from self-employment (including farming) depending on the degree of work that the recipient puts into the business; normally the individual

should not spend less than one-third of full-time employment on the business to get it classified as self-employment earnings. We use an indicator variable for self-employment income larger than zero in a specific period to check the robustness of our results on overall earnings.

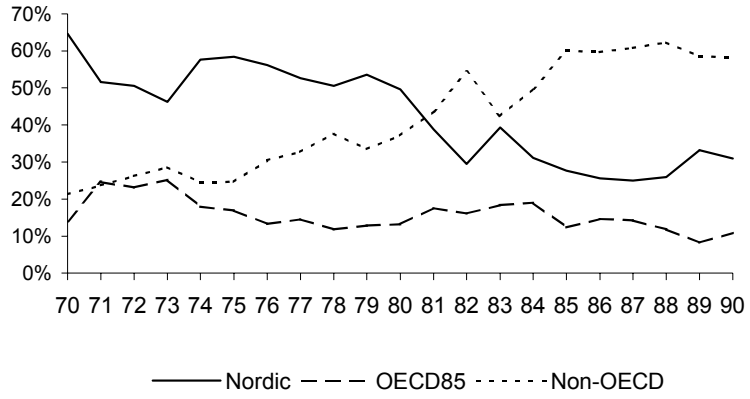
A.4.3. Social assistance

From 1983 and onwards, LINDA contains extensive information on transfers, among which social assistance and study allowances are included. We use amount received and months of receipt as alternative measures of the extent of social assistance dependency. Social assistance is given on a household basis, and all of it is then normally registered with one of the adults in the household. This has two implications. First, people may be recipients of social assistance without it being recorded in the registers. To deal with this, we attribute the largest amount or number of months in a household to every individual in it. Second, the household as a basis for provision makes people with families more likely than singles to be eligible for social assistance, given their earnings.

A.4.4. Study allowances

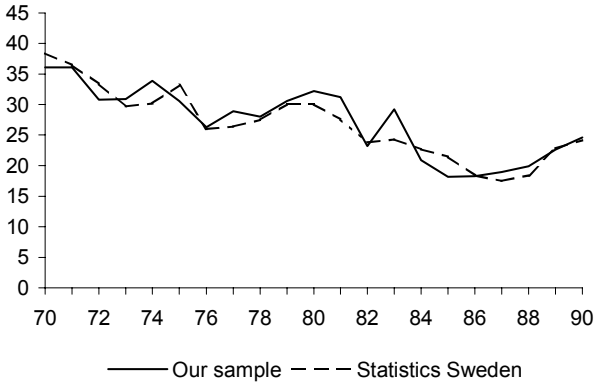
Our measure of study allowances is available from 1983 and includes only traditional governmental allowances and loans, plus educational stipends for graduate students (available from 1986). Educational transfers of labour market policy character are thus excluded.

Figure A.1. Cohort composition, fraction of total immigration



Source: Table A1.

Figure A.2. Return migration within five years, study sample and total immigrant population



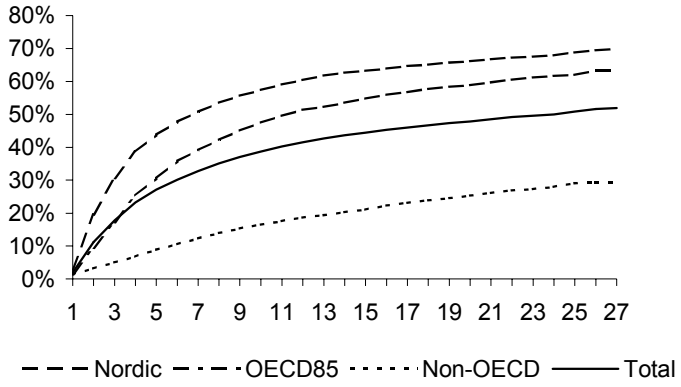
Source: Table 2 (for our sample) and Statistics Sweden (1998, p. 47).

Table A.2. Cross section estimates with natives and additional controls

Time since im.	1-5	6-10	11-15	16-20	21-	N	Adj R^2
Panel A:							
All	-1.187	-.672	-.549	-.375	-.127	43,386	.22
	(.026)	(.024)	(.031)	(.027)	(.016)		
Nordic	-.221	-.116	-.204	-.152	-.050	33,643	.21
	(.062)	(.051)	(.062)	(.040)	(.018)		
OECD	-.409	-.419	-.468	-.368	-.175	29,623	.22
	(.070)	(.071)	(.079)	(.072)	(.034)		
Non-OECD	-1.448	-.834	-.675	-.533	-.257	35,512	.26
	(.029)	(.027)	(.036)	(.035)	(.028)		
Panel B:							
All	-1.044	-.512	-.389	-.230		15,690	.18
	(.036)	(.033)	(.039)	(.034)			
Nordic	-.249	-.106	-.160	-.109		5,947	.08
	(.073)	(.059)	(.069)	(.047)			
OECD	-.168	-.150	-.215	-.127		1,927	.11
	(.110)	(.103)	(.107)	(.098)			
Non-OECD	-1.145	-.499	-.356	-.250		7,816	.19
	(.053)	(.050)	(.057)	(.056)			

Notes: Variations on estimations in Table 8. Additional controls: age and its square, gender, dummy for being married, interaction gender*married, and level of education dummies. Panel A includes natives as reference category; Panel B uses 21- as reference. To compare the estimates, subtract the estimate for 21- from estimates in Panel A.

Figure A.3. Cumulative emigration probability



Source: Table 3.