Immigrants' return to schooling in Sweden

Martin Nordin

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Immigrants' return to schooling in Sweden[1]

by

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Abstract

The aim of this paper is to examine if the returns to immigrants' schooling are lower than the returns to natives' schooling. In addition the paper tries to establish whether immigrants who invest in different amounts of Swedish education also differ in their returns to schooling. The results show that the difference in returns to schooling between immigrants and natives is generally quite small. Moreover, the returns to schooling are considerably higher for immigrants who arrived in Sweden during compulsory school age than for immigrants who arrived in Sweden after compulsory school age. Moreover, immigrants who complete their schooling in Sweden have, in general, much higher returns than immigrants with only foreign schooling.

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1 Introduction

In Sweden today, as in many other western countries, we observe an earnings gap between immigrants and natives. The earnings gap is large, especially for newly arrived immigrants from poor countries. That many immigrants, even after as much as twenty years since migrating, have an earnings disadvantage compared to natives with similar observable characteristics, indicates that the assimilation process may be slow in Sweden. Moreover, studies show that for non-European men the wage gap relative to native Swedes is particularly large (Edin and Åslund, 2001; le Grand and Szulkin, 2000; Scott, 1999).[3]

Borjas (1985) presents evidence suggesting that more recent immigrant cohorts are less qualified than earlier ones. This might also apply to Sweden where recent immigrant cohorts have mostly emigrated from countries with low income levels (Edin and Åslund, 2001).[4] To some extent the difference in earnings between immigrants and natives in Sweden might reflect ethnic discrimination (Arai et al., 1999; le Grand and Szulkin, 2000; Rooth, 2001).

A more fruitful approach here might be to take the human capital and the returns to immigrant's human capital into consideration. Human capital acquired abroad might not match the demands on the Swedish labour market perfectly. Moreover, language skills and Swedish-specific knowledge are factors that could very well be more important to succeed on the Swedish labour market today than before. An indication of the existence of such human capital problems is that the market returns to both foreign schooling and foreign experience seem to be lower than the return to domestic schooling and domestic experience. A number of studies show that this is the case in other countries (Bratsberg and Ragan, 2002; Friedberg, 2000; Schoeni, 1997).

The aim of this paper is to investigate whether the empirical evidence found elsewhere, that the returns to immigrants' schooling are lower than the returns to natives' schooling, also applies to Sweden. It will also try to illuminate whether immigrants who differ in the amount they invest in Swedish schooling

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[3] By taking into account the fact that it is primarily the least successful immigrants who emigrate back to their home country, Edin, LaLonde and Åslund (2000) show that the assimilation rate is often overestimated.

[4] However, Scott (1999) argues that the "quality" of the immigrant cohorts arriving in Sweden before 1993 has not decreased over time. Instead, there has been a shift in the Swedish labour demand.

also differ in their rates of returns to schooling. Besides examining the case of Sweden, the paper contributes additional evidence on immigrants' returns to schooling by using a population sample and, in contrast to many other studies, by considering immigrant women.

The strategy adopted to answer these questions is to divide the immigrants into two groups. The first group consists of immigrants who arrived in Sweden before turning 17 and who therefore have obtained all, or some, of their compulsory schooling in Sweden. The second group consists of immigrants who arrived in Sweden after the age of 16 and who therefore had the opportunity to complete their compulsory education before migrating to Sweden. With this division of the data we can compare the returns to schooling between immigrants who were integrated into the Swedish school system at an early stage and immigrants who acquired most of their schooling in their home country. Furthermore, by using information on when individuals attained their highest education we can determine whether the education of the immigrants in the second group completed their education in Sweden.[5] Using this information we can measure if there exists an association between the immigrants' returns to schooling and where the education has been acquired.

By restricting the sample to employed individuals, the study focuses on a subpopulation of immigrants. However, much of the earnings gap between natives and immigrants can be attributed to the fact that many immigrants on the Swedish labour market are unemployed or do not belong to the work force, i.e. they do not have any income from work at all (Edin and Åslund, 2001). Contrary to the U.S. experience, where the employment gap between natives and immigrants disappears approximately ten years after arrival (Chiswick, Cohen and Zach, 1997), Nekby (2002) shows that the employment gap between natives and immigrants in Sweden persists. Thus, because the selection process into employment is not considered, the full returns to schooling for immigrants may be larger than those reported here.[6]

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[5] By comparing age at highest education and age at migration we can determine if the education is foreign or Swedish. However, for approximately 50% of the immigrants there is missing information for the year of highest education variable.

[6] In table A1 it is shown that there is a positive relationship between years of schooling and employment for immigrants. For male immigrants the relationship is significantly stronger than for male natives.

The methodological approach used here is primarily to estimate separate Mincer earnings equations for natives and immigrants. Using the Mincer approach implies that we analyze whether the within-group returns to schooling differ between immigrants and natives, and not whether there exists earnings differences between immigrants and natives conditional on the level of education. Since we use the Mincer specification it is convenient to name the estimates "returns", although what is actually analyzed is the educational income differential within-group, and not the return (at least not in the causal sense).[7]

Section 2 gives a brief theoretical background and a survey of earlier research on immigrants' returns to human capital. The data are described in section 3 and the baseline returns to schooling estimates are reported for natives and immigrants in section 4. Section 5 analyzes whether immigrants' returns to schooling vary with age at migration and period of migration. Section 6 discusses whether immigrants benefit from investing in a Swedish education. Section 7 completes the paper with conclusions and a discussion.

2 Theoretical background and earlier studies

Lower returns to foreign human capital on the Swedish labour market could be due to many different reasons. Probably the most important one is the immigrants' lack of proficiency in the Swedish language. Not possessing other crucial Swedish-specific knowledge or skills could result in low returns to foreign education and experience. Moreover, the demand for some particular skills acquired in the home country might be nonexistent in Sweden. Another explanation, probably most applicable to immigrants from developing countries, is that the quality of the schooling and experience obtained in the home country is lower than the quality of Swedish schooling and experience. The same number of years of schooling for natives and immigrants are then not equally valued. It could also be that employers might have difficulties evaluating the immigrant's education. Another practical problem could be that highly qualified profes-

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[7] For more information on returns to schooling and whether they are a causal effect, see Card (1999).

sionals, for instance doctors, might have problems getting the Swedish certificate needed for continuing their professional career in Sweden.

A "devaluation" of the immigrants' human capital will primarily harm the high-educated immigrants. "Forcing" high-educated immigrants to accept jobs for which they are overeducated results in native-immigrant earnings differentials that are relatively larger for the academic education levels compared to the compulsory and upper-secondary education levels, and this will consequently serve to bring the empirical returns to schooling estimates down. However, Chiswick and Miller (2005) show that while overeducation, i.e., having a higher education level than the reference level, is one reason for the low returns to schooling for immigrants in the U.S., undereducation, i.e., having less education than the reference level, is as important a factor of immigrants' low returns to schooling.[8]

Studies based on American data report that immigrants who have invested in U.S. schooling have higher returns to schooling than immigrants who have not. Schoeni (1997) finds that this is true for all immigrant groups. However, even if the immigrant has invested in U.S. schooling, the returns to schooling vary between immigrant groups. He emphasizes that economic progress is highly related to country of origin and that immigrants who invest in U.S. schooling have considerably more years of education than immigrants who do not. A similar study, Bratsberg and Ragan (2002), establishes that the higher returns to schooling for immigrants, who have acquired U.S. schooling, do not depend on an ability bias or superior English skills. They draw the conclusion that U.S. education upgrades or validates foreign education. Moreover, even if the immigrants with U.S. schooling arrive on average at a younger age than immigrants with only foreign schooling, Bratsberg and Ragan provide evidence that the higher returns to schooling for the group of immigrants with U.S. schooling are not associated with the effect of growing up in the U.S. Irrespective of whether the immigrant has invested only in U.S. education or has merely completed the education in the U.S., the returns to schooling are the same and comparable to the returns to schooling for natives. Bratsberg and Ragan confirm that the returns to foreign schooling for immigrants vary with country of origin and that immigrants from countries with a high GDP per cap-

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[8] Undereducation drives the returns to schooling down if immigrants, with less education than is common for the occupation in which they work, earn a relatively high income.

ita and from English-speaking countries have the highest returns to foreign schooling. Consequently, Bratsberg and Ragan's study shows that immigrants from less developed countries have the strongest economic incentive to invest in U.S. schooling and receive the highest wage premium from this. School quality, measured as the pupil-teacher ratio and expenditures per pupil in the origin country, also seems to be correlated with the returns to schooling in the destination country.[9]

Friedberg (2000) constructs a more precise model of the relationship of earnings and, domestic and foreign education and domestic and foreign labour market experience. Using Israeli data Friedberg finds that natives receive higher returns from Israeli education and experience than immigrants do, and that Israeli education is more valued than foreign education for most immigrant groups. Furthermore, the Friedberg study also reports that the returns to foreign experience are generally insignificant. In accordance with the results of the American studies, immigrants who continue to invest in schooling after their arrival in Israel seem to increase their returns from foreign schooling. Some recent Canadian studies also report that foreign labour market experience is valued much less than experience obtained in the destination country (Alboim et al., 2005; Ferrer and Riddel, 2004).

A maybe surprising but very interesting result is found in Ferrer and Riddel (2004). They show that credentials and degrees acquired in the origin country are actually valued at least as much, and sometimes even more, than natives' credentials or degrees obtained in Canada. However, at the same time and consistent with the studies mentioned above, they find that the returns to schooling for immigrants are lower than the returns to schooling for natives.

3   Data

This study is based on register data from Statistics Sweden and is for a cross-sectional population sample for 2001.

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[9] See Bratsberg and Terrell (2002), where per capita GDP, English language and other factors are held constant.

Analogous to other studies in this field, young age groups and second-generation immigrants are excluded from the sample,[10] i.e. the sample is restricted to natives and immigrants[11] in the ages 26-64. Students, early retired and individuals who have a disability pension are also excluded. Unlike many other studies, which often restrict the sample to only men, we include women in our sample. This then constitutes a sample of 1,490,025 native men and 1,303,196 native women and 245,483 immigrant men and 227,474 immigrant women.

It is often preferred to have wage data when estimating returns to schooling, but for this data, i.e. register data from Statistics Sweden, Antelius and Björklund (2000) find that it does not seem to matter if you use hourly wages or annual earnings when excluding individuals with low incomes. Therefore, we restrict the sample to individuals who have an annual income from work above 60,000[12] SEK.[13]

Because the aim is to study the relationship between schooling and earnings and not schooling and employment we also restrict the sample to individuals employed in the third week of November. This leaves us with a sample of 1,238,468 native men and 1,048,083 native women and 153,455 immigrant men and 141,330 immigrant women. That about 37.5% of the immigrant men and 37.9% of the immigrant women are excluded because of these restrictions, compared to approximately 16.9% of the native men and 19.6% of the native

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[10] Immigrants arriving in Sweden during 2001 are also excluded, because they have not had the opportunity to work in Sweden for the entire year 2001 and therefore their earnings are not comparable to those of natives. Also, approximately 5% of the immigrants are excluded because migration year or education level or country of origin is missing. Education level is also missing for a very small number of natives.

[11] In this context native is defined as a Swedish-born individual with two Swedish born parents and who has lived in Sweden for his/her entire life. An immigrant is an individual who is foreign-born with two foreign-born parents.

[12] 60,000 SEK is about $8,000.

[13] One might feel some hesitation whether the findings in Antelius and Björklund (2000) also holds for immigrants. Moreover, restricting on SEK 60,000 might seem rather arbitrary. Therefore it is desirable to test whether the results are sensitive to changes in the size of the income restriction. Table A2 shows that when the income restriction is changed the return to schooling estimates for both immigrants and natives change. A higher income ceiling leads to a lower return to schooling estimate. This is consistent with the findings in Antelius and Björklund (2000). However, the changes are not substantial and it does not seem as if immigrants are more sensitive to the changes than natives are. Whereas the returns to schooling gap between immigrant and native men increases when using a higher income ceiling, the gap decreases for women. Thus, on overall, our results seem to stand even when the size of the income restriction is changed.

women, exposes in a striking manner the immigrants' problems in getting employment in Sweden.

Our strategy, to divide the immigrants into those arriving before or after the age of 16, which is used to illuminate if the returns to schooling for immigrants are connected to whether the education is Swedish or foreign, has the effect that the two groups differ concerning when they arrived in Sweden. Of the immigrants arriving in Sweden before turning 17, all arrived before 1992.[14] In comparison, of the immigrants arriving in Sweden after the age of 16 some arrived before and others after 1992. The immigrants who arrived in Sweden during 1992 or after have not only spent considerably fewer years assimilating into the Swedish society, they might also belong to a migration cohort that differs in other respects as well. For instance, during this time period the annual number of refugees coming to Sweden more than tripled. In 1992 almost 70,000 refugee immigrants from the former Yugoslavia applied for residence permits in Sweden. Moreover, 1992 was the year when Swedish unemployment started to increase quite rapidly and during the period 1991 to 1993 it went from 3 to 10.4%. This change for the worse in the Swedish labour market during the 1990s might primarily have hurt the labour market situation of immigrants arriving during this time period.[15]

This leaves us with three immigrant groups: i) the group of immigrants who arrived in Sweden before turning 17, and before 1992, and who have obtained all or some of their compulsory schooling in Sweden, ii) the group of immigrants who arrived in Sweden after the age of 16, and before 1992 and iii) the group of immigrants who arrived in Sweden after the age of 16, and during 1992 or after. The second and third immigrant groups have either a completely foreign education or, at least, a foreign compulsory education that has been supplemented in Sweden.

The data contains the educational attainment variable, SUN 2000, which is adjusted to fit the International Classification of Education (ISCED97). The constructed years of schooling variable contains all potential years of schooling

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[14] This is because we restrict the sample to individuals aged 26 or older.

[15] An alternative way of dividing the data could be before and after 1985, i.e. the year when a new settlement policy, the "Hela Sverige" strategy, was introduced. However, besides being a less logical year for dividing the data, dividing the data before and after 1985 also leads to less consistent result.

between eight and twenty, except for nineteen years of schooling. The earnings variable used is a measure of annual income from work for the year 2001.

In Table 1 descriptive statistics are reported for natives and the three immigrant groups. Descriptive statistics are also provided separately for immigrants from the Nordic countries, immigrants from western Europe (including immigrants from the U.S., Australia and New Zealand), immigrants from southern and eastern Europe, and immigrants from outside Europe.

Table 1 Descriptive statistics for natives and immigrants

Men	Annual Income	Schooling	Earnings sample	N
Natives	296	11.8	83.1	1,238,468
Nordic Countries	281	11.2	73.8	47,956
Western Europe	314	13.1	68.9	16,983
Southern and Eastern Europe	241	12.0	61.9	43,701
Outside Europe	231	12.3	52.6	44,815
Age at migration: <17	269	11.6	73.6	38,428
Year of migration: <1992	261	11.7	62.6	76,538
Year of migration: ≥1992	243	12.8	54.2	38,489
Women				
Natives	211	12.1	80.4	1,048,083
Nordic Countries	215	11.7	75.9	55,371
Western Europe	230	13.1	63.3	10,699
Southern and Eastern Europe	199	12.2	59.5	39,825
Outside Europe	183	11.9	50.2	35,435
Age at migration: <17	206	11.9	71.8	34,349
Year of migration: <1992	211	11.8	67.4	76,064
Year of migration: ≥1992	184	12.6	46.3	30,917

Notes: Annual income is annual income/1000. "Earnings sample" is the share employed and who have an income from work above 60,000 SEK. The schooling measure is average years of schooling for the individuals belonging to the "earnings sample".

Worth emphasizing in Table 1 is that immigrants who arrived during 1992 or after are on average more educated than both natives and immigrants who arrived in Sweden before 1992. Furthermore, immigrants from western Europe are on average more educated and have a higher income than natives, whereas

immigrants from the Nordic countries are less educated than natives. The earnings differential between natives and immigrants is especially large for immigrants from southern and eastern Europe, for those from outside of Europe, and for those who arrived in Sweden during 1992 or after. For these immigrant groups the probability of having an annual income from work above 60,000 SEK, i.e. of being employed, is also much lower compared to natives.

4 Estimating the returns to schooling for immigrants and natives

Since Chiswick (1978) the earnings function most often estimated when studying the labour market assimilation of immigrants is:

(1) $$\ln y = \alpha_0 + \beta_0 S + \beta_1 Exp + \beta_2 Exp^2 + \beta_3 Ysm + \beta_4 Ysm^2 + \alpha_1 M + \varepsilon$$

which is a special case of the even more well-known Mincer equation. Here, log earnings is regressed on years of schooling, S, potential experience and potential experience squared, Exp and Exp^2, years since migration and years since migration squared, Ysm and Ysm^2, and finally an indicator variable for immigrant status M. β_0 gives us the relationship between annual income and schooling, i.e. the familiar returns to schooling estimate.

In Table 2 and Table 3 different versions of the earnings function are estimated separately for immigrant men and women and for native men and women, respectively. Model 2 in Table 2, where we only control for years of schooling and region of origin, shows that the returns to schooling estimate for immigrant men is 5.9 and for immigrant women 5.0. In comparison, model 1 in Table 3 shows that the returns to schooling estimate is 6.9 for native men and 5.9 for native women.

Given the schooling level of the individual, model 2, in Table 2, shows that immigrants from the Nordic countries are the immigrant group with highest annual income. When controlling for potential experience (model 3 in Table 2 and model 2 in Table 3) we find that the returns to schooling estimate increases for both immigrants and natives. Whereas the returns to experience estimate is almost as high for immigrant women as for native women, it is

considerably smaller for immigrant men than for native men.[16] Including years since migration into the model does not seem to affect the returns to schooling estimate for immigrants. Moreover, controlling for labour market region and family status has only a minor impact on the returns to schooling estimate for immigrants. For the full model, i.e. model 6 for immigrants and model 4 for natives, a significant[17] difference in returns to schooling between natives and immigrants is found, 0.4 for men and 1.0 for women.

Table 2 OLS Earnings equation estimates for immigrants

Men (n=153,455)	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	12.439***	11.779***	11.547***	11.419***	11.455***	11.481***
	(.002)	(.005)	(.009)	(.009)	(.010)	(.010)
Western Europe	.071***	-.046***	-.039***	-.009**	-.014***	-.019***
	(.004)	(.004)	(.004)	(.004)	(.004)	(.004)
Southern and Eastern Eur.	-.150***	-.201***	-.188***	-.141***	-.144***	-.158***
	(.003)	(.003)	(.003)	(.003)	(.003)	(.003)
Outside Europe	-.207***	-.271***	-.250***	-.203***	-.216***	-.224***
	(.003)	(.003)	(.003)	(.003)	(.003)	(.003)
Schooling		.059***	.064***	.064***	.064***	.062***
		(.000)	(.000)	(.000)	(.000)	(.000)
Experience			.010***	.008***	.008***	.005***
			(.001)	(.001)	(.001)	(.001)
Experience^2/ 100			-.012***	-.012***	-.013***	-.011***
			(.000)	(.000)	(.000)	(.000)
YSM				.011***	.011***	.012***
				(.000)	(.00)	(.000)
YSM^2/100				-.014***	-.013***	-.015***
				(.000)	(.000)	(.000)
Labour market region	No	no	no	no	yes	yes
Married, small children	No	no	no	no	no	yes
R^2	.046	.152	.159	.171	.179	.185

[16] However, it could be that we underestimate the return to experience for immigrants because of measurement errors in the experience estimate for immigrants, i.e. that there is a larger discrepancy between experience and potential experience for immigrants than for natives.

[17] An independent sample t-test is used (throughout in the paper) for comparing if the returns to schooling differ between samples.

Women (n=141,330)						
Intercept	12.201***	11.618***	11.198***	11.069***	11.156***	11.323***
	(.002)	(.005)	(.010)	(.010)	(.011)	(.011)
Western Europe	.030***	-.042***	-.029***	-.006	-.006	-.004
	(.005)	(.005)	(.005)	(.005)	(.005)	(.005)
Southern and Eastern Eur	-.095***	-.122***	-.098***	-.056***	-.048***	-.050***
	(.003)	(.003)	(.003)	(.003)	(.003)	(.003)
Outside Europe	-.175***	-.186***	-.137***	-.099***	-.112***	-.109***
	(.003)	(.003)	(.003)	(.003)	(.003)	(.003)
Schooling		.050***	.058***	.059***	.057***	.054***
		(.000)	(.000)	(.000)	(.000)	(.000)
Experience			.019***	.015***	.016***	.011***
			(.001)	(.001)	(.001)	(.001)
Experience^2/100			-.024***	-.021***	-.023***	-.020***
			(.000)	(.000)	(.000)	(.000)
YSM				.014***	.013***	.012***
				(.000)	(.000)	(.000)
YSM^2/100				-.021***	-.019***	-.017***
				(.000)	(.000)	(.000)
Labour market region	no	no	no	no	yes	yes
Married, small children	no	no	no	no	no	yes
R^2	.030	.121	.142	.157	.175	.196

Notes: The dependent variable is logarithmic annual income from work. The reference group is from the Nordic countries. Robust standard errors in parentheses.

Table 3 OLS Earnings equation estimates for natives

Men (n=1,238,468)	(1)	(2)	(3)	(4)
Intercept	11.680 (.002)***	11.270 (.003)***	11.433 (.003)***	11.501 (.003)***
Schooling	.069 (.000)***	.075 (.000)***	.070 (.000)***	.066 (.000)***
Experience		.024 (.000)***	.025 (.000)***	.021 (.000)***
Experience^2/100		.000 (.000)***	.000 (.000)***	.000 (.000)***
Labour market region	no	no	yes	yes
Married, small children	no	no	no	yes
R^2	.141	.167	.196	.209

Women (n=1,048,083)				
Intercept	11.457 (.002)***	10.971 (.003)***	11.141 (.003)***	11.315 (.003)***
Schooling	.059 (.000)***	.071 (.000)***	.066 (.000)***	.064 (.000)***
Experience		.022 (.000)***	.024 (.000)***	.020 (.000)***
Experience^2/100		.000 (.000)***	.000 (.000)***	.000 (.000)***
Labour market region	no	no	yes	yes
Married, small children	no	no	no	yes
R^2	.112	.150	.185	.223

Notes: The dependent variable is logarithmic annual income from work. Robust standard errors in parentheses.

In Table 4 model 6, i.e. the full specification, is estimated separately for the Nordic countries, western Europe, southern and eastern Europe and outside of Europe. Here, we also include indicator variables for the specific country of origin. The first finding is that there is only a minor variation in the returns to schooling for the different groups of origin. Roughly, one finds that the returns to schooling estimates are significantly higher, 0.5-1.0, for the immigrant groups from the Nordic countries or western Europe in comparison to those from either southern and eastern Europe or outside of Europe.

Table 4 OLS Earnings equation estimates for immigrants of different origin

Men	The Nordic Countries	Western Europe	Southern and Eastern Eur.	Outside Europe
Schooling	.063 (.001)***	.063 (.001)***	.051 (.001)***	.058 (.001)***
Experience	.014 (.001)***	.021 (.002)***	.003 (.001)***	.007 (.001)***
Experience^2/ 100	-.021 (.000)***	-.038 (.000)***	-.012 (.000)***	-.017 (.000)***
YSM	-.000 (.001)	-.003 (.001)***	.017 (.001)***	.019 (.001)***
YSM^2/100	.000 (.000)	.011 (.000)***	-.018 (.000)***	-.023 (.000)***
R^2	.166	.167	.186	.180
N	47,956	16,983	43,701	44,815

Women				
Schooling	.056 (.001)***	.059 (.002)***	.052 (.001)***	.048 (.001)***
Experience	.016 (.001)***	.015 (.002)***	.010 (.001)***	.013 (.001)***
Experience^2/ 100	-.024 (.000)***	-.028 (.000)***	-.020 (.000)***	-.024 (.000)***
YSM	.003 (.001)***	.003 (.001)***	.019 (.001)***	.017 (.001)***
YSM^2/100	-.006 (.000)***	-.001 (.000)	-.024 (.000)***	-.021 (.000)***
R^2	.171	.176	.202	.196
N	55,371	10,699	39,825	35,435

Notes: The dependent variable is logarithmic annual income from work. In all models country of origin, labour market region and family status are controlled for. Robust standard errors in parentheses.

If the relationship between schooling and annual income differ in respect of linearity between immigrants and natives, it might partly explain our results.

However, in Figure A 1 to A 4, where we use a more flexible speciation, i.e. dummy variables for each year of schooling instead of the continuous year of schooling variable, the relationship between schooling and annual income seems to be fairly similar between natives and immigrants. At least, the observed differences in the relationship seem in general to be well captured by the differences in the return to schooling estimates.

A second finding is that, for immigrants from the Nordic countries or western Europe, the years-since-migration coefficient is very small (and even negative for men) and the experience coefficient relatively large.[18] This probably reflects the fact that the assimilation time is short for immigrants from these regions, while their foreign experience is fairly transferable and is rewarded on the Swedish labour market.

The large years-since-migration coefficient for both male and female immigrants from southern and eastern Europe or outside of Europe indicates that there are high labour market assimilation rates for immigrants from these regions.[19] Moreover, for men from the same regions the experience estimate is very small,[20] which confirms the result that the returns to experience for men from developing countries are noticeably smaller than for men from developed countries (Bratsberg and Ragan, 2002, Friedberg, 2000).

5   Do age at migration and period of migration matter?

Do age at migration and period of migration affect the returns to schooling? To find out we split up our data into the three different immigrant groups, i.e. the group that arrived in Sweden before turning 17, and the two years since migration groups (before and after 1992). Estimating the returns to schooling for

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[18] As before, excluding the years since migration variable from the model does not affect the schooling estimate for any of the different regions. Neither does using indicator variables instead of the continuous years-since-migration variable seem to change the schooling estimate a great deal.

[19] This result might, however, also reflect the fact that the earlier cohorts are of higher quality than the more recent cohorts.

[20] For some reason women from southern and eastern Europe or outside of Europe benefit more from experience than men from the same regions.

each of these groups brings more variation into the results. In Table 5 the returns to schooling estimates are given for each of the three immigration groups, separately for the different regions of origin.[21]

Table 5 shows that the returns to schooling for immigrants arriving in Sweden before turning 17 are significantly higher than for immigrants arriving in Sweden after the age of 16. In general, the returns to schooling for immigrant men arriving in Sweden before turning 17 actually exceed the returns to schooling for native men significantly (6.6 according to Table 3). For women the returns to schooling for this group of immigrants are the same as for native women (6.4 according to Table 3). Thus, integrating into the Swedish compulsory schooling system seems to decrease the difference in returns to schooling between natives and immigrants.[22]

This also indicates that the lower returns to schooling that immigrants generally receive are primarily, or entirely, related to the human capital of the individual, and therefore not to labour market discrimination. If ethnic discrimination affects the returns to schooling then immigrants arriving in Sweden during compulsory school age would also have returns to schooling that are lower than natives' returns to schooling. Here, we do not consider that ethnic discrimination could cause the intercept to be lower for immigrants than for natives, i.e. that there might exist a general income gap between immigrants and natives. Instead the result only means that ethnic discrimination is not the reason why the earnings gap might increase with the education level.

Further, examining the returns to schooling, for the group of immigrants arriving in Sweden before turning 17, reveals that the returns to schooling vary between the different regions of origin. Perhaps surprisingly, the immigrants from the Nordic countries seem to receive the lowest returns to schooling, 6.0 for men and 5.9 for women.[23] Moreover, among the young migrants it is those from southern and eastern Europe and from outside of Europe that receive the highest returns to their schooling. For southern and eastern Europe the returns

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[21] We continue to estimate the full specification, i.e. what is referred to as model 6 in table 2. When estimating the model for the different regions the indicator variables for specific country of origin are included.

[22] By restricting the sample to only those arriving in Sweden before the age of eleven, i.e. for those truly integrated into the Swedish compulsory schooling system, similar results are found.

[23] Compared to the other groups of origin the returns to schooling are significantly lower.

to schooling estimate is 7.9 for men and 6.8 for women, and for outside of Europe the estimate is 8.3 for men and 7.3 for women.[24]

Table 5 Returns to schooling estimates for the different immigrant groups

Men	Age at mig: <17	Year of mig: <1992	Year of mig: ≥1992
The Nordic countries	0.060 (.002)	0.056 (.001)	0.094 (.004)
Western Europe	0.073 (.004)	0.054 (.002)	0.081 (.003)
Southern and Eastern Europe	0.079 (.003)	0.055 (.002)	0.038 (.001)
Outside Europe	0.083 (.004)	0.055 (.001)	0.052 (.002)
Total	0.069 (.001)	0.055 (.001)	0.056 (.001)
Women			
The Nordic countries	0.059 (.002)	0.051 (.001)	0.071 (.003)
Western Europe	0.065 (.004)	0.054 (.003)	0.060 (.005)
Southern and Eastern Europe	0.068 (.003)	0.057 (.001)	0.041 (.002)
Outside Europe	0.073 (.003)	0.050 (.001)	0.034 (.002)
Total	0.064 (.001)	0.053 (.001)	0.043 (.001)

Notes: The dependent variable is logarithmic annual income from work. All coefficients are significant on the 1%-level. Robust standard errors in parentheses.

For immigrants belonging to the second immigrant group, i.e. immigrants arriving in Sweden after the age of 16 and before 1992, the returns to schooling are 5.5 for men and 5.3 for women and vary little between different regions of origin. This is further evidence indicating that ethnic discrimination is not a factor for explaining returns to schooling for immigrants.

However, for the group of immigrants arriving during 1992 or after there are large differences in the returns of the different regions of origin. Recently arrived immigrants from the Nordic countries and western Europe have significantly higher returns to schooling than recently arrived immigrants from southern and eastern Europe or outside of Europe. Thus, there seems to have been a

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[24] This could be because of quality differences between the immigrant cohorts from the Nordic countries or western Europe and the cohorts from southern and eastern Europe or outside of Europe.

quality (given observed characteristics) increase in the cohorts migrating from the Nordic countries and from western Europe, probably because there has been a change in the factors determining the migration flows from these regions, i.e. from push to pull migration, and maybe that the relative differences in conditions between Sweden and the Nordic countries and western Europe primarily pull cohorts of high quality to Sweden today. The low returns to schooling for the recently arrived immigrants from southern and eastern Europe or outside of Europe are either due to a decrease in cohort quality or to assimilation problems.

6   Does swedish schooling pay off?

To what extent have immigrants invested in further education after arriving in Sweden, and does a Swedish education affect immigrants' earnings?

To decide whether an immigrant's schooling is only foreign or if he/she has completed the education in Sweden, we make use of data on which year the individual attained his/her highest education. If this is later than the year of migration, we assume that the immigrant has continued studying after arriving in Sweden, and that the highest education reached thus is Swedish.[25] However, many of the sources Statistics Sweden uses for collecting the educational attainment data do not contain information about the year of highest education. For as many as 51.4% of the immigrants there is missing information about the year when the highest education was attained. In comparison, 32.5% of the natives have missing information for this variable. Since the data provides us with a year of highest education variable of poor quality, we must proceed very carefully.Table 6 shows the distribution of immigrants having a Swedish or a foreign education, and missing information, for the different immigrant groups.

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[25] In those cases where year of highest education is the same as year of migration we assume that the individual completed the education before migrating to Sweden and that the education therefore is foreign.

Table 6 shows that missing values for years of highest education are most frequent for immigrants arriving in Sweden during 1992 or after.[26] For the different origin groups we find that immigrants from the Nordic countries most often have a Swedish education and least often missing information, whereas the opposite is the case for immigrants from southern and eastern Europe.

Table 6 Distribution of immigrants with a swedish education, a foreign education, and missing information for the year of highest education variable

	"Missing"	Foreign education	Swedish education
The Nordic countries	46.6%	10.9%	42.6%
Western Europe	50.7%	16.4%	32.8%
Southern and Eastern Europe	59.2%	15.1%	25.7%
Outside Europe	50.0%	14.9%	35.1%
Age at migration: <17	29.9%	0.0%	70.1%
Year of migration: <1992	46.6%	22.3%	31.1%
Year of migration: ≥1992	84.8%	9.0%	6.2%
Total	51.4%	13.7%	34.9%

Table 7 gives the mean schooling level for our three immigrant groups, and for each of the three education classifications. The most important finding is that, irrespective of the immigrant group, the individuals with missing information for the year of highest education variable are considerably less educated than the immigrants with either a Swedish or a foreign education. However, for the group of immigrants arriving in Sweden during 1992 or after, which apparently is by far the most educated immigrant group, the "missing value" individuals are also fairly well educated. The lower mean education level for the individuals with missing information is primarily because as much as 97.6% of the

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[26] For immigrants arriving in Sweden around the year 1983 the share of immigrants with missing values for year of highest education is the smallest, approximately 30%. For those who came before 1980 the share of immigrants with missing values for year of highest education seems to slowly increase with years since migration, up to a level of approximately 50% for those who came between 1952 and 1965, and 60% for those who arrived before 1952.

immigrants with either eight or nine years of schooling belong to the group with missing information for year of highest education.

Table 7 Mean schooling level for the education classifications

	"Missing"	Foreign education	Swedish education
Age at migration: <17	10.2	-	12.4
Year of migration: <1992	10.4	12.8	13.0
Year of migration: ≥1992	12.4	14.6	13.5

6.1   Strategy for handling the "missing value" individuals

Before estimating the returns to schooling for individuals with a foreign or a Swedish education, we will take a closer look at the "missing value" individuals in order to see whether we can classify them as having either a foreign or a Swedish education.

We start by looking at the immigrants arriving in Sweden before turning 17. According to Table 7 there are no individuals with a foreign education among the young migrants.[27] The assumption that these young migrants have been integrated into the Swedish compulsory education system therefore seems valid.

For the immigrants arriving after the age of 16 and with missing values for the year of highest education, there might be some who have invested in a Swedish education. However, we believe that this is not a very common phenomenon and we will therefore categorize the missing value individuals as having only a foreign education. There are two reasons indicating that this is a sensible thing to do. First, of the individuals arriving in Sweden after the age of 16, the percentage of those who have invested in a Swedish education seems to be reasonably high, 34.5%.

Secondly, for the immigrants arriving in Sweden after the age of 16 (and who do not belong to the "missing value" group) there is no difference in the mean schooling level between those who have invested in a Swedish education

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[27] Actually, according to the data only 21 immigrants arriving before or during the age of 16 had a foreign education. This number should be compared to the fact that a total of 72,777 belong to the group.

and those with only a foreign education, the mean years of schooling being 13.0 for both groups. Still, one would expect the mean schooling level of immigrants who have invested in a Swedish education to be higher than the mean schooling level of immigrants with only foreign schooling. By merging the "missing value" individuals with the immigrants who have already been categorized as having only a foreign education, we get a mean schooling level difference that seems plausible; the difference in mean schooling years after the merging amounts to 1.3 years.

Even if the merging of the "missing value" individuals with the immigrants with only a foreign education may seem to be quite drastic at first, we believe that the fraction of misclassifications is not large enough to cause any major biases in our results. The estimation results in section 6.3 also support the fact that the strategy is sensible. We will come back to this later on.

6.2   The return to schooling among immigrants arriving in Sweden as adults

In this section we estimate the returns to schooling for the group that has invested in a Swedish education and for the group categorized as having only foreign schooling. The method used is to include, in a joint model, an interaction between years of schooling and Swedish education. The schooling estimate then gives the returns for the group with only a foreign education, and by adding the interaction effect to the schooling estimate we get the returns to schooling for the group that has invested in Swedish education.

In Table 8 estimation results are reported separately for men and women. In column 1 for men and column 3 for women the interaction between years of schooling and a Swedish education is added to the now familiar model.[28] The results show that the returns to schooling for the immigrants who have completed their education in Sweden are a little more than two percentage points higher compared to the immigrants with only foreign schooling. For immigrants with a Swedish education the returns to schooling estimate, 7.7 for men and 6.7 for women, is even higher than the returns to schooling for natives and immigrants who arrived before turning 17 (the returns to schooling are 6.6 for

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[28] A dummy variable indicating whether the education is Swedish or foreign is also included in the model, i.e. we let the intercept vary for the two groups.

native men and 6.4 for native women, whereas for immigrants arriving in Sweden before turning 17 they are 7.2 for men and 6.4 for women).

Selection might obviously bias the returns to education estimate upward for the group that invests in a Swedish education. It might be the case that the immigrants who decide to invest in a Swedish education are the ones who stand to benefit the most from it.[29] However, in the case of the U.S., Bratsberg and Ragan (2002) show that the higher returns for the immigrants who acquire U.S. schooling are not a result of ability bias.

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[29] When comparing the returns to schooling between immigrants and natives we have to take into account the fact that the returns to schooling for natives are presumably also overestimated because of the well-known ability bias.

Table 8 Returns to schooling results for immigrants with swedish and foreign schooling

	Men (n=115,027):		Women (n=106,981):	
	(1)	(2)	(3)	(4)
Intercept	11.602 (.012)***	11.578 (.013)***	11.456 (.012)***	11.460 (.013)***
Western Europe	-.037 (.005)***	-.037 (.005)***	-.009 (.006)**	-.010 (.006)*
South. East. Europe	-.201 (.004)***	-.199 (.004)***	-.073 (.003)***	-.073 (.003)***
Outside Europe	-.270 (.004)***	-.272 (.004)***	-.139 (.004)***	-.139 (.004)***
Swedish education	-.287 (.015)***	-.285 (.029)***	-.255 (.014)***	-.303 (.027)***
Schooling	.055 (.001)***	.056 (.001)***	.047 (.001)***	.047 (.001)***
Schooling×Swe. education	.022 (.001)***	.020 (.001)***	.020 (.001)***	.021 (.001)***
Experience	.005 (.001)***	.006 (.001)***	.008 (.001)***	.008 (.001)***
Experience^2/100	-.011 (.000)***	-.014 (.000)***	-.016 (.000)***	-.016 (.000)***
Experience×Swe. education		-.001 (.002)		.005 (.002) ***
Experience^2×Swe. education/100		-.002 (.000)		-.006 (.000)*
YSM	.016 (.001)***	.013 (.001)***	.017 (.001)***	.017 (.001)***
YSM^2/100	-.024 (.000)***	-.017 (.000)***	-.029 (.000)***	-.026 (.000)***
YSM×Swe. education		.011 (.002)***		.002 (.002)
YSM^2×Swe. education/100		-.032 (.000)***		-.002 (.000)
R^2	.193	.195	.207	.208

Notes: The dependent variable is logarithmic annual income from work. The reference group is from the Nordic countries. In all models labour market region and family status are controlled for. Robust standard errors in parentheses.

Instead, since the "Swedish education" estimate is negative and relatively large, low-educated immigrants with only foreign schooling have a higher income

than immigrants who have invested in a Swedish education.[30] Figure 1(for men) and Figure 2 (for women), where we estimate the income premiums for each year of schooling for the Swedish educated and the foreign educated immigrants,[31] clearly show that this is the case. Moreover, the estimated income premiums show that the Swedish educated catch up, and for the education levels 12 to 15 for men and 13 to 17 for women the Swedish educated receive a somewhat higher income than the foreign educated. For the highest education levels the income premiums seem to be quite similar.[32]

Figure 1 and Figure 2 Estimated income premiums for the swedish and the foreign educated immigrants
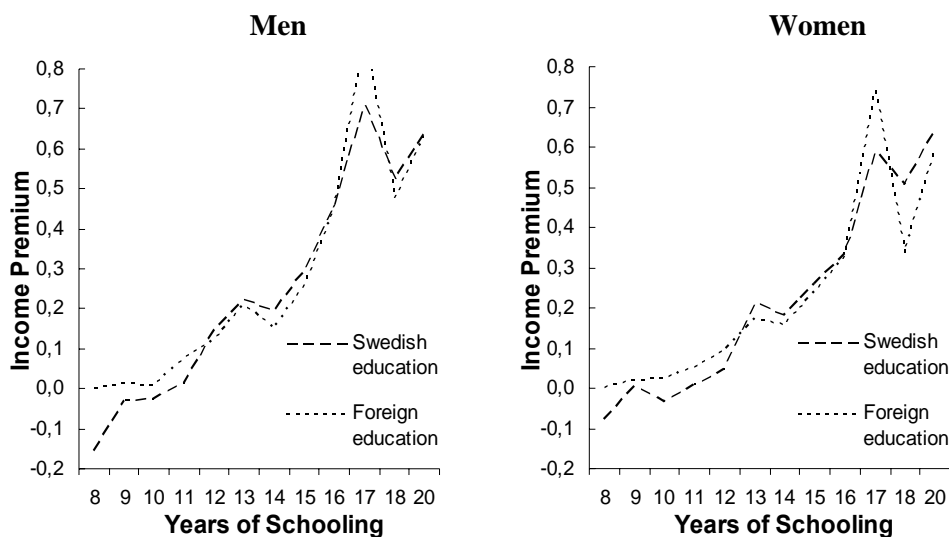
Notes: The reference group has eight years of foreign education. Apart from using dummy variables for each year of schooling instead of the continuous schooling variable, the model specification is the same as in Table 8 (column 2 for men and column 4 for women).

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[30] However, note that the "Swedish education" estimate gives the predicted income difference between a Swedish educated and a foreign educated immigrant with zero years of schooling.

[31] Instead of the continuous schooling variable, we use dummy variables for each year of schooling. Separate dummy variables are also used for those with a Swedish and a foreign education.

[32] When estimating the dummy-variable model separately for immigrant from southern and eastern Europe and outside of Europe the observed pattern is very distinct, especially for men.

Thus, the returns to schooling estimate for the immigrants who have invested in a Swedish education is high for two reasons. The first reason is that the immigrants with a Swedish academic education, compared to the foreign-educated immigrants, have a somewhat higher income in general. However, after studying the income premiums, we find that the most important reason for the high returns to schooling for the Swedish educated immigrants is the low incomes of the immigrants with a low Swedish education level. Most of all, this finding suggests that the immigrants who invest in low Swedish education levels are negatively selected.[33] Thus, even if we do not have ability bias in the traditional sense, ability might affect selection into low Swedish education, resulting in a reversed ability bias.

By adding, in column 2 and column 4, interactions between a Swedish education and potential experience and years since migration to the model, we let the returns to experience estimate and the years since migration estimate vary with education status. However, it turns out that this does not change the returns to schooling estimates for either men or women.

Because, as Friedberg (2000) clarifies, years since migration, *Ysm*, basically adds to years of Swedish schooling and years of Swedish experience,[34] the *Ysm* variable measures a weighted average of the relative difference in returns to Swedish and foreign schooling and the relative difference in returns to Swedish and foreign experience. A special case of this is when the individual has not invested in any Swedish education. Then the experience variable captures foreign experience and, by adding the experience estimate and the *Ysm* estimate, we get the returns to Swedish experience.

For the immigrants with only foreign schooling the experience estimate is very small for men but somewhat larger for women. Adding the *Ysm* estimate to the experience estimate gives us the returns to Swedish experience. Two findings emerge from this calculation. The first is that foreign experience is valued much less than Swedish experience (the difference is given by the *Ysm* estimate),[35] which is in accordance with results found elsewhere (Alboim, Finnie and Meng, 2005, Ferrer and Riddel, 2004, Friedberg, 2000). The second

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[33] By negatively selected we mean that it is less productive individuals who decide to invest in the low Swedish education levels.
[34] For immigrants arriving in Sweden after the age of six.
[35] This is primarily true for immigrants from southern and eastern Europe or outside of Europe.

finding is that the returns to Swedish experience are higher for immigrant women than for native women.

Because the *Ysm*[36] estimate for immigrants with Swedish schooling does not give us the difference in returns to Swedish and foreign experience, we are not able to give the same interpretation of the results for the Swedish educated immigrants. Instead, the large *Ysm* estimate and the low experience estimate for men could be interpreted as an indication that male immigrants who invest in a Swedish education have a much higher labour market assimilation rate than immigrants with no Swedish schooling. However, the estimation results do not yield the same conclusion for women.

In Table 9 the returns to schooling are displayed, separately for men and women, for each group of origin. Here, it is also necessary to divide the immigrants into our two *Ysm* groups, otherwise important findings do not show up. The table shows that for immigrants arriving in Sweden before 1992 it is positive to invest in a Swedish education. An exception is Western Europe; for this group of origin there does not seem to be any difference in returns to schooling between the two types of education. As expected, the immigrant with an education obtained outside of Europe has the lowest returns to schooling, and this is true for both men and women.

A quite different scenario turns up when we study the group of immigrants arriving in Sweden during the year 1992 after or. For male immigrants from southern Europe and outside of Europe, completing their education in Sweden does not bring about an increase in the returns to schooling. Women from these parts of the world do, however, benefit from a Swedish education. In the case of male immigrants from the Nordic countries and western Europe, the group of immigrants with only a foreign education receives significantly higher returns to schooling than the immigrants who invest in a Swedish education. The very high returns to schooling for the male immigrants from the Nordic countries and western Europe with a foreign education is probably a result of a selection process in the cohorts migrating to Sweden during the year 1992 or after. It is likely that many of the immigrants from the Nordic countries and from western Europe arrive in Sweden because of a job offer, and for such a group it is not surprising that the returns to schooling are high.

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[36] We now take the interaction effects into account.

Table 9 Foreign and swedish returns to schooling estimates for the different groups of origin

Men	The Nordic countries	Western Europe	Southern and Eastern Eur.	Outside Europe
Year of migration: <1992:				
Schooling	.049 (.001)***	.057 (.003)***	.047 (.002)***	.042 (.002)***
Schooling×Swe. ed.	.048 (.003)***	-.005 (.005)	.030 (.003)***	.034 (.002)***
Year of migration: ≥1992:				
Schooling	.097 (.004)***	.083 (.003)***	.038 (.002)***	.052 (.002)***
Schooling×Swe. ed.	-.025 (.013)*	-.034 (.012)***	.007 (.005)	-.003 (.005)
Women				
Year of migration: <1992:				
Schooling	.046 (.001)***	.057 (.003)***	.051 (.002)***	.038 (.002)***
Schooling×Swe. ed.	.022 (.002)***	-.004 (.006)	.023 (.003)***	.036 (.003)***
Year of migration: ≥1992:				
Schooling	.071 (.003)***	.062 (.005)***	.041 (.002)***	.032 (.002)***
Schooling×Swe. ed.	.013 (.011)	-.026 (.020)	.015 (.006)**	.016 (.006)***

Note: The dependent variable is logarithmic annual income from work. Robust standard errors in parentheses.

6.3 Sensitivity analysis

Having reported a large returns to schooling difference between the Swedish and the foreign educated immigrants, a decisive question is; is it correct to classify the "missing value" individuals as having a foreign education. The easiest way to answer this question is to exclude the "missing value" individual from the regression and re-estimate the model. If the returns to schooling estimate does not change, it indicates that the individuals with missing values for the year of exam variable have not, after arriving in Sweden, invested in education that affects their returns to schooling.

Thus, in Table 10 (column 1 for men and column 2 for women) the model in Table 8 is re-estimated when the "missing value" individuals are excluded. According to the results in Table 10, the returns to schooling estimate is unaffected for men with a foreign education. For women with a foreign education the returns to schooling estimate increases slightly. The increase is, however, not large enough for us to deviate from the overall conclusion: merging the "missing value" individuals with the immigrants with only a foreign education seems plausible and does not cause any major biases in the returns to schooling estimates.[37]

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[37] Other changes in the coefficients probably reflect the fact that there is a much larger fraction of "missing value" individuals among the immigrants arriving during the 1990s. The immigrants arriving in Sweden before and after 1992 differ in many ways, and, by excluding a relatively large fraction of immigrants arriving in Sweden after 1992, the composition of the sample changes, and therefore the estimation results also change. That it is primarily the Ysm estimates that change confirms this.

Table 10 Estimating the return to schooling when excluding individuals with "missing value"

	Men	Women
Intercept	11.702 (.040)***	11.371 (.032)***
Western Europe	-.043 (.008)***	-.023 (.008)***
Southern and Eastern Europe	-.140 (.006)***	-.056 (.005)***
Outside Europe	-.197 (.006)***	-.109 (.005)***
Swedish education	-.443 (.047)***	-.214 (.043)***
Schooling	.055 (.002)***	.054 (.002)***
Schooling×Swe. education	.021 (.002)***	.014 (.002)***
Experience	.008 (.003)***	.013 (.002)***
Experience^2/100	-.022 (.000)***	-.027 (.000)***
Experience×Swe. education	-.004 (.003)	-.001 (.003)
Experience^2× Swe. Education/100	.008 (.000)	.006 (.000)
YSM	-.001 (.002)	.008 (.002)***
YSM^2/100	.012 (.000)***	-.009 (.000)**
YSM×Swe. education	.025 (.003)***	.007 (.002)***
YSM^2×Swe. education/100	-.056 (.000)***	-.018 (.000)***
R^2	.188	.190
N	45,156	46,944

Notes: The dependent variable is logarithmic annual income from work. The reference group is from the Nordic countries. In all models labour market region and family status are controlled for. Robust standard errors in parentheses.

7 Conclusions

The analysis of the returns to schooling of immigrants in Sweden leaves us with three main findings. First, for immigrants arriving in Sweden as adults, the returns to schooling are on average one log point lower than for natives. Hence, the difference in returns to schooling between immigrants and natives is generally quite small which indicates that investments in education are also economically rewarding for immigrants. Second, the difference in returns to schooling between immigrants and natives is larger for women than for men.

Third, and consistent with the results in the U.S. studies, the amount of education obtained in Sweden seems to be the most important factor for explaining variations in the returns to schooling estimate for different immigrant groups. The results show that immigrants who arrive in Sweden either during their compulsory school-age or as adults, and complete their education in Sweden, have significantly higher returns to schooling than immigrants with no Swedish schooling. The results also show that it is primarily immigrants arriving before 1992 who benefit from investing in a Swedish education. However, as the newly arrived immigrants become more assimilated they might also benefit from a Swedish education.

In contrast to what is found in the U.S. studies we find only small differences in the returns to schooling by regions of origin, for adult immigrants arriving before 1992,. Still, when discussing the relationship between origin and the returns to schooling, one has to take differences in cohort quality into account. For the immigrants from the Nordic countries and western Europe it seems obvious that there has been a positive change in cohort quality. The very low returns to schooling found for the recently arrived immigrants from southern and eastern Europe and from outside of Europe could be due either to a decrease in the cohort quality or to changes in labour demand.

Negative selection among some cohorts of immigrants, who decide to invest in low Swedish education levels, might be one reason for the, much higher returns to schooling estimate for the immigrants with a Swedish education compared to the immigrants with only foreign schooling. This occurs if it is the less skilled, and to a large extent unemployed, immigrants who are pushed into education. Such selection increases the mean ability level of the immigrants with a low foreign education and lowers the mean ability of immigrants with a short Swedish education. This selection process will thus increase (reduce) the slope of the earnings-schooling relationship for immigrants with a Swedish (foreign) education.

Since there seems to be a positive relationship between years of schooling and employment for immigrants, the "full" returns to schooling for immigrants are probably larger than those reported in this study. Because much of the earnings gap between natives and immigrant reflects the fact that many immigrants are unemployed or do not belong to the workforce the selection process into employment is important and should be more carefully examined in future research.

What conclusions can be drawn concerning the reasons for the lower returns to schooling for immigrants than for natives based on these findings? There are two reasons to believe that immigrants' low returns to schooling are not due to ethnic discrimination. First, if ethnic discrimination was the reason, the returns to schooling for immigrants who arrived in Sweden as adults would vary much more with region of origin. Second, that male immigrants who arrived during school-age actually have returns to schooling that exceed those of male natives is not consistent with ethnic discrimination.

Instead, the great importance of Swedish schooling indicates that prospective employers place a lower value on education acquired abroad. Whether this is purely because Swedish schooling increases language proficiency (and other Swedish-specific skills), or reflects the fact that foreign education, is of lower quality than Swedish education is, however, uncertain.

References

Alboim, N., Finnie, R. and Meng, R., 2005, "The Discounting of Immigrants' Skills in Canada: Evidence and Policy Recommendations", *IRPP Choices*, 11 (2).

Antelius, J. and Björklund, A., 2000, "How Reliable are Register Data for Studies of the Return on Schooling? An examination of Swedish data", *Scandinavian Journal of Educational Research*, 44 (4), pp. 341-355.

Arai, M., Regner, H. and Schröder, L., 1999, Är arbetsmarknaden öppen för alla?" Bilaga 6, Långtidsutredningen 2000, Fritzes, Stockholm.

Borjas, G., 1985, "Assimilation, Changes in Cohort Quality, and the Earnings of Immigrants", *Journal of Labour Economics*, 3 (4), pp. 463-489.

Bratsberg, B. and Ragan J., 2002, "The Impact of Host-Country Schooling on Earnings: A Study of Male Immigrants in the United States", *The Journal of Human Resources*, 37 (1), pp. 63-105.

Bratsberg, B. and Terrell, D., 2002, "School Quality and Returns to Education of U.S. Immigrants", *Economic Inquiry*, 40 (2), pp. 177-198.

Card, D., 1999, "The Causal Effect of Education on Earnings", In *Handbook of Labor Economics, Volume 3*, edited by Ashenfelter, O. and Card, D., Amsterdam: Elsevier Science B.V.

Chiswick, B., 1978, "The effect of Americanization on the Earnings of Foreign-born Men", *The Journal of Political Economy*, 86 (5), pp 897-921.

Chiswick, B., Cohen, Y. and Zach, T., 1997, "The Labor Market Status of Immigrants: Effects of the Unemployment Rate at Arrival and Duration of Residence", *Industrial and Labor Relations review*, 50 (2), pp. 289-303.

Chiswick, B. and Miller, P., 2005, "Why Is the Payoff to Schooling Smaller for Immigrants?", IZA Discussion paper, No:1731.

Edin, P-A., LaLonde, R. and Åslund, O., 2000, "Emigration of immigrants and measures of immigrant assimilation", *Swedish Economic Policy Review*, 7, pp. 163–204.

Edin, P-A. and Åslund, O., 2001, "Invandrare på 1990-talets arbetsmarknad", in *Ofärd i välfärden*, edited by Bergmark, Å., SOU 2001:54, pp. 101-142.

Ferrer, A. and Riddel, W., 2004, "Education, Credentials and Immigrant earnings", UBC Working paper, August 2004.

Friedberg, R., 2000, "You Can't Take It with You? Immigrant Assimilation and the Portability of Human Capital", *Journal of Labor Economics*, 18 (2), pp. 221-251.

Nekby, L., 2002, "Employment Convergence of Immigrants and Natives in Sweden", Working paper 2002:9, Department of Economics, Stockholm.

le Grand, C. and Szulkin, R., 2002, "Permanent Disadvantage or Gradual Integration: Explaining the Immigrant-Native Earnings Gap in Sweden", *Labour*, 16 (1), pp. 37-64

Rooth, D-O., 2001, "Etnisk diskriminering och "Sverige-specifik kunskap - vad kan vi lära från studier av adopterade och andra generationens invandrare?" *Ekonomisk Debatt*, 29 (8), pp. 535-546.

Schoeni, R., 1997, "New Evidence on the Economic Progress of Foreign-Born Men in the 1970s and 1980s", *The Journal of Human Resources*, 32 (4), pp. 683-740.

Scott, K., 1999, *The Immigrant Experience: Changing Employment and Income Patterns in Sweden, 1970 - 1993, Ph.D thesis*, Lund studies in economic history 9.

Appendix

Table A 1 The relationship between employment and schooling

	Immigrant Men	Immigrant Women	Native Men	Native Women
Intercept	.429 (.008)***	.198 (.009)***	.674 (.002)***	.451 (.003)***
Western Europe	-.052 (.004)***	-.091 (.004)***		
Southern and Eastern Europe	-.093 (.003)***	-.079 (.003)***		
Outside Europe	-.187 (.003)***	-.150 (.003)***		
Schooling	.016 (.000)***	.020 (.000)***	.012 (.000)***	.019 (.000)***
Experience	-.001 (.000)***	.015 (.000)***	.008 (.000)***	.019 (.000)***
Experience^2	.000 (.000)***	.000 (.000)***	.000 (.000)***	.000 (.000)***
YSM and	.016 (.000)***	.021 (.000)***		
YSM^2 and	.000 (.000)***	.000 (.000)***		
R^2	.087	.140	.053	.065
N	245,483	227,474	1,490,025	1,303,196

Notes: The dependent variable measures if the individual is employed, and has an annual income from work above 60,000 SEK. The reference group is from the Nordic countries. In all models labour market region and family status are controlled for. The relationship is estimated with a linear probability model. Unclustered robust (constructed in Stata 9) standard errors in parentheses.

Table A 2 Estimates of the return to schooling when using different sizes of the income restrictions

Income restriction	Immigrant Men	Native Men	Immigrant Women	Native Women
>0	.066 (.001)	.070 (.000)	.063 (.001)	.074 (.000)
60,000	.062 (.000)	.066 (.000)	.054 (.000)	.064 (.000)
100,000	.058 (.000)	.065 (.000)	.051 (.000)	.060 (.000)
140,000	.056 (.000)	.064 (.000)	.047 (.000)	.054 (.000)

Notes: The dependent variable is logarithmic annual income from work. The full specification, i.e. what is referred to as model 6 in Table 3 for immigrants and model 4 in Table 4 for natives, is estimated. All coefficients are significant on the 1%-level. The coefficients are given in log points. Unclustered robust (constructed in Stata 9) standard errors in parentheses.

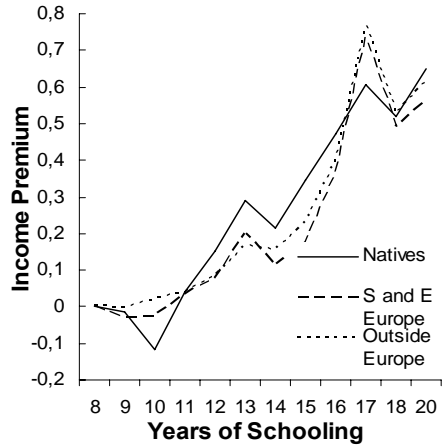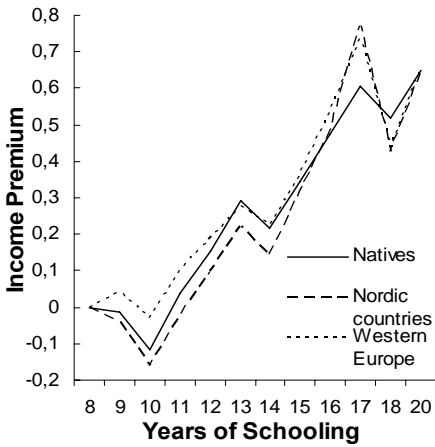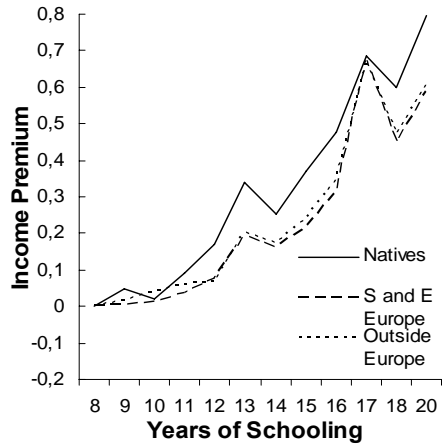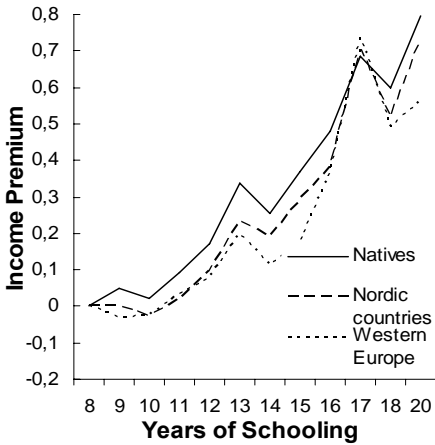Figure A 1 and Figure A 2 Estimated income premiums. men

Figure A 3 and Figure A 4 Estimated income premiums, women

Notes: The reference group has eight years of foreign education. Apart from using dummy variables for each year of schooling instead of the continuous schooling variable the model specification is the same as in Table 4 (column 6) for immigrants and Table 3 (column 4) for natives. Among immigrants it is primarily physicians who have seventeen years of schooling, and because physicians earn a very high income the income premium for seventeen years of schooling for immigrants is high. The low income premium for ten years of schooling is because this is mainly dropouts from upper secondary education. The relatively low income premium for fourteen and fifteen years of schooling can be explained with study programme (i.e. that nurses and teachers has a low return to their education).

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Table A 3 Variable list

Variable	Definition of the variable
Employed	Work at least one hour during the "first" week of November. The work could be as an employed, self-employed or non-paid worker in the family business.
Unemployed	Not employed and searching for work. Full time students searching for work are not labeled as unemployed.
Labour force	Either employed or unemployed.
The Nordic countries	Born in any of the Nordic countries.
Western Europe	Born in western Europe, northern America, Australia or New Zealand.
Southern and eastern Europe	Born in eastern Europe, southern Europe, Turkey, Belarus, Ukraine, Russia and U.S.S.R.
Outside Europe	Born in any other part of the world.
Native	Swedish born individuals with two Swedish born parents
First generation Immigrant	Foreign born individuals.
Schooling	Years of schooling.
Potential experience	Age-7-Years of schooling.
Years since migration	2001-Year of migration.
Age when migrating: <17	Migrating before turning 17.
Year of migration: <1992	Year of migration<1992
Year of migration: ≥1992	Year of migration≥1992
Year of highest education	Year of highest education.
Swedish education	If year of highest education>year of migration
Foreign education	If year of highest education≤year of migration
Missing value for year of highest education	If there is missing information for the variable year of highest education.
Labour market region	81 different labour market regions (Nuteks basis of division).
Married	Married or registered partnership.
Small children	Having a child under the age of 7.

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