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Wages of childhood immigrants in Sweden

– education, returns to education and overeducation

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Wages of childhood immigrants in Sweden – education, returns to education and overeducation[§]

by

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Abstract

We analyse full-time monthly wages of employees with parents born in Sweden and of childhood immigrants who arrived before the end of compulsory school-age. We use a detailed disaggregation of background countries, which shows considerable heterogeneity, in overeducation, in returns to education and in birth-country coefficients, unexplained by wage models. Both the non-European childhood immigrants and of those from Southern Europe suffer a wage disadvantage relative to natives, men to a larger extent than women. Returns to education are generally lower for non-European childhood immigrants than for natives. Comparison with workers, who immigrated as adults, shows that the childhood immigrants of most nationalities run lower risk of being overeducated and have a smaller wage disadvantage. The child/adult immigrant difference is larger, the larger the disadvantage of the adult immigrants from a country of origin. But for male childhood immigrants from some of the labour transmitter countries, the risk of overeducation is larger than it is for adult immigrants and the difference in adjusted wages between childhood immigrants and adult immigrants also tends to be smaller than for other countries of origin.

Keywords: Wages, immigrants, childhood immigrants, returns to education and over-education
JEL-codes: J31, J61, J15, I24

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1 Aim of the paper

A number of studies have demonstrated that integration into the Swedish labour market is precarious for immigrants and that this is particularly so for those of non-European background. There is general agreement that the greatest source of the immigrant – native income gap is the difference in employment rates – the hurdles immigrants face in gaining entry to the labour market. Nevertheless, most studies find that there is also an earnings differential between employed individuals with different country origins. There is an abundance of anecdotal evidence indicating that in order to find employment, immigrants, more often than natives, have to take jobs for which they are overqualified and the few quantitative studies that have been made tend to confirm this (Ekberg and Rooth, 2003; Ekberg and Rooth, 2006; le Grand et al., 2013). In this paper, we ask whether this is also the case for immigrants who came to Sweden as children and have a Swedish education.

There are several reasons why immigrants may face difficulties on the labour market such as lack of language skills or foreign qualifications. This does not apply to a second generation, which has grown up and been educated in the country. Like Heath and Cheung (2007), we consider the labour market integration of the children of immigrants to be a crucial test of the real equality of opportunity in a society. In this study, we focus on wages; education and returns to education; overeducation and returns to overeducation among employees who immigrated to Sweden before the age of 16 years ("childhood immigrants") – individuals who have obtained their highest educational qualifications from a Swedish institution and should have had a reasonable opportunity to acquire what is sometimes called "Sweden-specific human capital". We use high-quality register data, rich in variables, with a good measure of monthly full-time wage rates and a large number of observations. Although we include undereducation in our estimates, the focus of the paper is on overeducation

We analyse the wages of childhood immigrants and of workers with parents born in Sweden. The questions we pose are:

- Are there wage disadvantages associated with being born in a country other than Sweden, even for those who immigrated as children?
- Can such differences be attributed to differences between the (partial) returns to education for childhood immigrants and those of natives? To what extent can

childhood immigrants diminish their labour market disadvantage by acquiring more education?

- Do childhood immigrants have higher probability of being overeducated relative to their occupation, than workers with parents born in Sweden? Is overeducation a mechanism behind wage disadvantage and lower returns to education for childhood immigrants relative to natives?
- At the end of the paper, we also make a comparison between immigrants who came to Sweden as children and immigrants who arrived as adults in order to see whether having an, at least partly, Swedish education makes a difference to the probability of overeducation and to wages.

Most previous studies of labour market outcomes of immigrants or children of immigrants that have been made in Sweden have aggregated all - or nearly all - those with non-European backgrounds into a single category, despite the large differences in reason for and timing of immigration, as well as in education, language and other characteristics within this group. Throughout our analysis we make a detailed division by country or region of origin as well as by gender and we are able to demonstrate substantial heterogeneity. This is highly policy relevant since it indicates a need for flexible integration policies that can be adapted to differing needs among different groups, rather than a "one size fits all" approach to integration.

The main results of our study are

- Even though we control for a rich set of characteristics, both individual and job specific, a majority of groups have a negative wage differential relative to native Swedes. Of the few groups with a positive differential, all but one are European, North American or Australian. The returns to schooling are generally lower for children of immigrants than for natives of the same gender. For male childhood immigrants from most countries and regions in the Global South, low returns to education are one of the main mechanisms behind the wage gap relative to native Swedes.
- The part of the immigrant-native wage gap attributable to overeducation is not so large for childhood immigrants even though workers with an immigrant background do run a larger risk than other Swedes of having a job with lower educational requirements than the schooling that they actually have.

- In most cases both the wage differential relative to natives and the risk of overeducation are smaller for childhood than for adult immigrants but in some cases – mostly for the labour migrant transmitter countries – the difference is remarkably small.
- Most of the outcomes that we measure vary substantially between children of immigrants of different country origins. In some respects, we can discern a regularity related to type of migration, to geographical distance from Sweden or "visible minorities" [1] but in many cases this is not true. Simple dichotomies like refugee versus labour migration or Northern-Western versus non-European origins hide as much as they explain. In particular, our findings indicate that the children of labour immigrants of the 1960s and 1970s also face difficulties in the Swedish education system and labour market.

2 An introduction to occupation-education mismatch

The term overeducation has been common in economics since the publication of Richard Freeman's book *The over-educated American* in 1976. The very extensive literature on the relation between wages and Overeducation, Required education and Undereducation (ORU) originated with the article by Duncan and Hoffman in the *Economics of Education Review*, 1981. While traditional wage estimations model productivity as a function of acquired education, the ORU- models distinguish between an individual's attained level of education and the education required for her/his job or occupation. This makes it possible to estimate how education-occupation mismatch (i.e. over- and undereducation) affects the returns to education. They have been used in the analysis of gender wage gaps by Miller and Voon (2007) and Johansson and Katz (2007) and in analysis of native-immigrant wage differentials by, among others, Chiswick and Miller (2008; 2010a; 2010b), Pohl Nielsen (2007; 2011) and Wald and Fang (2008).

The standard results from practically all studies of wages and overeducation is that years of schooling above what is required for the employee's job are rewarded, but less

[1] The term "visible minority" is used by the National Board of Health and Welfare for immigrants and children of immigrants from South East Europe (Greece and former Yugoslavia), Africa, Asia and Latin America (Socialstyrelsen. 2010).

so than years of schooling that are required (Hartog, 2000b; Chiswick and Miller, 2010a; Rubb, 2003).

For reasons of space, we will only give a brief introduction to the literature here and provide references to more extensive expositions.[2]

Explanations of have been advanced from different theoretical perspectives. Those based on *human capital theory* emphasise that the productivity of workers depends not only on formal schooling but also on experience, on-the-job training and ability. A young worker may accept a position that requires less education in the hope of being promoted to a more qualified job. Several empirical studies indicate that the probability of overeducation is lower for workers with longer work experience (Hartog, 2000b; Groot and Maassen van den Brink, 2000; Sicherman, 1991; Sloane et al., 1999; Sloane, 2007). Nevertheless, Korpi and Tåhlin (2007) find in a longitudinal study that overeducated workers do not "catch up" – the "wage penalty" for having been overeducated at an early stage in a worker's career does not diminish over time.

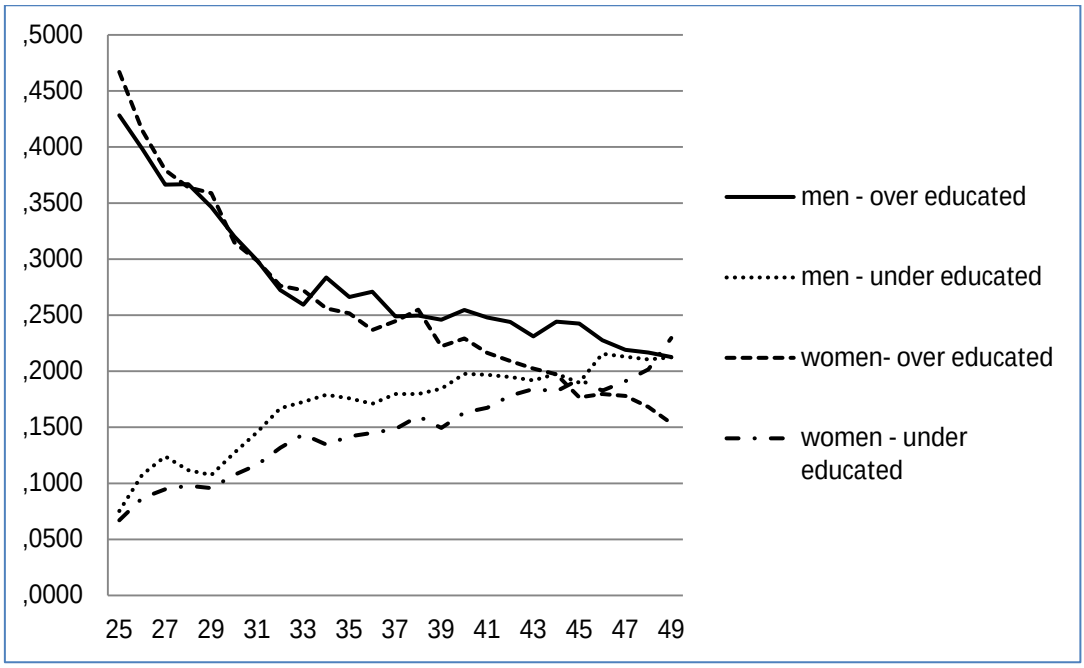
As can be seen in Figure 1, the percentage overeducated among Swedish employees is not very much lower for 50 year-olds than for 35 year-olds, for either men or women. This agrees with a recent Danish study which found that of native Danes who were overeducated in the mid-1990s, two thirds remained overeducated five years later, according to one measure of overeducation, and more than three quarters when another measure was used (Nielsen, 2011). The larger share overeducated in cohorts born in the 1970's in Sweden is partly a statistical artefact due to a reform of Swedish upper secondary education[3] and cannot be expected to diminish very much with age for these groups. Thus, overeducation cannot be dismissed as a transient and unimportant phase that entrants to the labour market pass through.[4]

[2] For introductions to the ORU literature, see Hartog (2000a, 2000b), Groot and Maassen van den Brink (2000), Büchel and van Haam (2003) or McGuinness (2006).

[3] According to the classification we apply, a number of occupations require a two-year upper secondary school program. These were abolished in the first half of the 1990s and to acquire these occupational skills, students needed to attend a three year program which also included knowledge and skills not directly related to the occupations.

[4] Leuven and Oosterbeek (2011) in their survey of the literature emphasize the regularity with which overeducation is persistent at the individual level.

Figure 1: Share overeducated of men and women by age. All employed aged 25-49 years



A second theoretical framework that can be invoked is that of *search theory*. Searching for a good match can be time-consuming and costly for both worker and employer, particularly if the search is constrained to a geographically limited labour market. Like human capital theory, search theory would predict a decrease in overeducation over time as workers find better matches through on-the-job search.

A third approach is that of *assignment theory* which places a stronger emphasis on demand side factors, in addition to the determinants of labour supply (Sattinger, 1993). Even if mismatch is a transitory phenomenon for the individual worker, it is still likely to be a permanent feature of the labour market as a whole since, in a dynamic economy, technology and consumer demand, as well as opportunities for education are continuously changing and are very unlikely to match perfectly at any one time.

In a critical review of the mismatch literature, Leuven and Oosterbeek (2011) argue that the relations between ORU-variables and wages cannot be interpreted as causal because of potential ability bias – the overeducated workers may be less able or less motivated than similarly educated workers in more qualified jobs and therefore not really mismatched at all. Studies from several countries have found that a larger share of first-generation immigrants than of natives is overeducated (Pohl Nielsen, 2007). The reasons generally cited in the literature are selection effects, limited transferability of

skills (such as language proficiency) and discrimination (Chiswick, 1978). If immigrants are overeducated because of a limited transferability of skills – language, education acquired in another country – that would constitute a heterogeneity bias in the terms of Leuven and Oosterbeek's critique. Since the present study is of workers who were either born in Sweden or immigrated as children it is more difficult to conceive that systematic differences in the likelihood of over-education according to parents' birth country should merely be an expression of equally systematic differences in unobserved ability or motivation. In addition, we control for a number of factors, such as field of education and sector and industry of occupation.

Chiswick and Miller (2008) find that, in the US, the proportions of both under-educated and overeducated workers are larger among immigrants than among native-borns. They ascribe the greater propensity of undereducation to positive selection effects among immigrant workers with low education and the greater propensity of overeducation to "less-than-perfect international transferability of skills" (op. cit. p. 1326), above all among highly educated immigrants. In a study of male immigrants to the US whose level of education is a Bachelor's Degree or higher (Chiswick and Miller, 2010b), the same authors find a high proportion who is overeducated relative to their occupations, far higher than among US-born men with the same level of education. As each year of required education increases wages by two percentage points more than the average for a year of attained education, the high frequency of overeducation implies a considerable wage disadvantage for immigrants.

Since labour markets tend to be characterised by less than perfect information, informal contacts that can "tip off" about job openings or "put in a good word" are essential. Limited knowledge of where and how to find good jobs and of whom to ask is not directly related to the immigrants' potential productivity at work, but contributes to their disadvantage in the labour market. Behtoui (2008) finds that a large share of recent job matches in the Swedish labour market were found through informal channels and that this put immigrants, as well as children of immigrants, at a disadvantage relative to native Swedes. Having an informal network was essential for finding a job, and the quality of the network mattered for the quality of the job found. Logically, any factor that decreases the immigrants' chances of receiving a job offer should increase the

likelihood that they end up with a worse match, such as a job for which they are overqualified.

Several of the obstacles that adult immigrants face in the labour market apply also to childhood immigrants, although, presumably, to a lesser degree. If children of immigrants grow up in a highly segregated environment where a large proportion of adults (including their parents) are not employed, it is probable that they have fewer contacts to rely on in finding jobs. Extreme segregation also makes it more difficult to acquire proficiency in the Swedish language.[5] Yet, in general, the children of immigrants in our sample should have acquired substantial "Sweden specific" knowledge and know-how and the highest educational credentials, that they present prospective employers with, are from Swedish institutions.

Pohl Nielsen (2011) finds that immigrants who had acquired their education in Denmark were less likely than those with a foreign education to be overeducated, but more likely than native Danes. However, returns to actual education were similar to those for Danes and substantially higher than for immigrants with a foreign education. For the last group, the wage penalty associated with overeducation was larger than for both natives and for immigrants with a Danish education.

3 Labour market outcomes for immigrants in Sweden

Until around 1980, immigration to Sweden was mainly labour immigration and mostly of blue collar workers. Immigrants, on average, had higher participation rates than natives. The labour immigrants of the 1950s and 60s found jobs, but these jobs were, for the most part, unskilled or low-skilled. (Knocke, 2000). According to surveys by Statistics Sweden, in 1975 and 1987 (Statistics Sweden, 1977:97; Statistics Sweden, 1991:88) and work place-surveys (Knocke, 2000 and additional references therein), immigrant workers had fewer opportunities of learning on the job and received less training than native workers. Long after immigration, in 1990, more than a third of male Finnish immigrants in Sweden worked in un-skilled or semi-skilled occupations and so did more than 40 per cent of Greeks and Yugoslavs, compared to 25 per cent of native Swedish men. Furthermore, a third of male second generation Swedes, with parents

[5] A study by the Swedish National Agency for Education found that when 80 % or more of a school's students had immigrant background the negative effect on school grades was considerable, even though a number of individual and parental characteristics were controlled for (Skolverket, 2004).

from these three countries, were also in semi- or unskilled occupations (Jonsson, 2007). According to case studies of female blue-collar workers in manufacturing and health care, immigrant workers had been offered fewer chances of training and promotion (Knocke, 2000).

In the course of the 70s, the participation rate of immigrants decreased to a level below that of natives (Ekberg and Andersson, 1995; Ekberg, 1999). Aguilar and Gustafsson (1994) show that the relative earnings of foreign-born workers, Nordic, and other European as well as non-European, deteriorated during the period 1978 to 1990.

Le Grand and Szulkin (2002) estimate standardized wage differentials between natives and immigrants and find that immigrants on average earn about 5.5 per cent less than natives (measured in full-time equivalent monthly earnings). For women, the corresponding figure is 2.8 per cent. However, immigrant men from non-European countries earn approximately 15 per cent less than natives and women 12 per cent less. When le Grand and Szulkin restrict their analysis to workers with a Swedish upper secondary education, there is still an earnings gap between non-European immigrants and natives but it is smaller, about -6 per cent.

Several studies demonstrate that labour market outcomes for children of immigrants in Sweden are heterogeneous with respect to the birth country of their parents. Both Southern Europe and non-European countries of origin are associated with negative differentials relative to native Swedes in terms of both employment and earnings (Rooth and Ekberg, 2003; Behtoui, 2004; Behrenz et al., 2007; Nordin and Rooth, 2009a).

Carlsson and Rooth (2008) found that (faked) job applications from job-seekers with "Middle Eastern-sounding" names and an education acquired abroad were much less likely to result in a call-back from prospective employers than, otherwise equal, applications from individuals with "Swedish-sounding" names and Swedish education were. Job-applicants with education and work experience from Sweden but "foreign" names were somewhat more likely to receive a call-back than those with foreign qualifications, but not at all as likely as those with "Swedish-sounding" names.

A study of intergenerational earnings mobility among immigrants does not find any regression toward the native mean for the immigrant groups (Hammarstedt and Palme, 2006). Like the earlier study by Rooth and Ekberg (2003), Hammarstedt and Palme conclude that groups who did relatively well in the first generation do even better in the

second, and groups who did relatively badly in the first generation do worse in the second. They show that among immigrants from Africa, the Middle East, Greece and Turkey the differences in yearly earnings compared to natives are larger in the second generation than in the first. (Observations of the first generation were made in 1975 and 1980 and of the second generation in 1997, 1998 and 1999.)

Nordin (2011) finds that returns to a year of schooling for immigrants who arrived in Sweden as adults are about one percentage point lower than those of natives. He also finds that these differentials are larger for women than for men and that returns to education are smaller for immigrants from Southern or Eastern Europe and from outside Europe than for those from the Nordic countries or Western Europe.[6] However, according to Nordin's estimates, those who immigrated before 17 years of age get larger returns to education than natives, above all non-European immigrants. He therefore concludes that the lower returns to schooling that adult immigrants receive can primarily, or entirely, be attributed to the human capital of the individual and not to labour market discrimination.[7]

In practise, the distinction between lack of "Sweden-specific human capital" and discrimination is not always clear-cut. Part of the limited transferability of education acquired abroad can be a real difference in content or quality, but part can be due to limited knowledge or prejudice on the part of employers when assessing a foreign degree, which give rise to direct or to statistical discrimination. To know the language is, of course, important. Yet, there is a fine line between what *are* insufficient language skills in order to perform a job well, and what is *perceived* as insufficient. Hertzberg (2003) concludes from interviews with employment office staff (arbetsförmedlare) that the Swedish language proficiency that employers required were not necessarily related to job content. There is evidence that speaking with an accent (negatively) influences perception of the speakers' personalities (Cunningham.Andersson) as well as of their general linguistic ability and professional competence (Boyd, 2003; Rödin and Özcan, 2011). The restriction of our sample eliminates the issue of foreign education credentials. The childhood immigrants may still speak with an accent but to a far lesser degree than adult immigrants.

[6] He includes Australia, New Zealand, the US and Canada in "Western Europe"

[7] He does not discuss, however, the possibility that statistical discrimination may lead to lower pay-off to an education acquired outside Sweden if employers are risk averse.

4 Data and definitions

We use register data for 2005 from the database of the Swedish Institute for Labour Market Policy Evaluation (IFAU) which is derived from different registers of Statistics Sweden, including the population register, the tax-register, the enterprise register and the Wage Database. The last includes monthly earnings transformed into full-time monthly wages for all public sector employees who were employed in November 2005 and a stratified sample of 50 per cent of private sector employees. (Sampling weights are provided and are used in all our estimates.) Thus, we make estimates of wage rates, adjusted for time worked while – with the exception of le Grand and Szulkin (2002) – earlier studies have used unadjusted annual earnings. With annual earnings it is impossible to distinguish the effects of a wage gap from that of part-time or part-year (un)employment. Since the statistical analysis is of *wages*, we leave out the self-employed. Immigrant entrepreneurship should be the subject of separate analysis.

The analysis is limited to individuals aged 25-49 who were either

- Born in Sweden but with both parents born outside Sweden ("second generation Swedish").
- Born outside Sweden but immigrated before age 16 ("childhood immigrants").[8]
- Born in Sweden with at least one parent born in Sweden ("natives").[9]

The population register includes 2 967 000 individuals in the 25-49 age range. 1 278 000 of these are included in the Wage Data Base and assigned an occupation. With the sampling weights, this sample represents just over 2 million employees. After exclusion of those who immigrated as adults, 1 170 000 observations remain, representing 1 867 000 employees.

Having excluded individuals who immigrated to Sweden at age 16 or older we do not have the same problems when we interpret the results that we would have if some individuals had an education acquired outside Sweden, the quality of which might be

[8] Chiswick and Miller (2008) use the term "child immigrants" for those who immigrated as children.

[9] We are aware that terminology in this area is controversial. On the other hand, a very exact naming that avoided all pitfalls would make the text excessively long-winded. We therefore occasionally call people who were born in, say, Turkey or Denmark "Turkish" and "Danish", even though all Swedish citizens are, of course, Swedish. Those who were born in Sweden but whose parents were not, we call "second generation Swedish" (avoiding the misnomer "second generation immigrants"). We use the term "native" or "native Swedish" or "Swedish origin" for those who are born in Sweden and have at least one parent born in Sweden, irrespective of whether they belong to an ethnic minority or if their grandparents were immigrants. As with "native Swedish" we ignore ethnic distinctions and use country-names as a purely geographical designation of country of birth – we don't know whether someone born in Iran or Turkey is ethnic Persian/Turkish or Kurdish or a person from Romania is ethnic Romanian, Roma, Jewish or Hungarian etc..

more difficult for employers to assess. Further, the childhood immigrants did not make the decision to immigrate; it was made for them by their parents. This should reduce self-selection problems, even if it does not eliminate them entirely. Including only children of immigrants who are born in Sweden, or having a lower cut-off age at immigration would have ensured that the respondents had received all, or at least a larger part of their schooling in Sweden, but would have left us with very few observations of individuals from a number of countries, non-European countries in particular. (Our sample only includes individuals who were employed in 2005 and whose parents immigrated before 1996.) [10]

Thus, our choice of sample has some drawbacks, but both our sensitivity checks and previous Swedish studies support our conclusion that a lower cut-off point for age at immigration would have made little difference to our results. On balance, we consider that the gain in sample size, in particular of individuals from the more recent refugee immigrant waves, outweighs the disadvantage.

We considered including all children of immigrants, both those born in Sweden and those who arrived as children in each country/region subgroup. For the nationalities that immigrated mainly in the 1960s and 1970s this would have worked well. From Africa, Latin America and Asia, only small numbers immigrated early enough for their children to be born in Sweden and at least 25 years old in 2005 and these early immigrants differed considerably from the later, larger immigration cohorts, both in terms of labour market characteristics, reasons for immigration and the conditions they met in Sweden. Descriptive statistics, as well as model estimates, indicated that there was very substantial heterogeneity between the childhood immigrants and the children born in Sweden to immigrant parents from these countries and that they ought to be treated separately in the analysis. On the other, hand the second generation Swedes with non-European parents were too few to make the detailed division that we wanted. We have included this group as a single category in the statistical analysis, but we consider the group very heterogeneous and in the discussion that follows we will not pay much attention to it. We will focus on the childhood immigrants and, to a minor extent on second generation

[10] The effects of age at immigration and parents' time in Sweden for child immigrants and second generation Swedes have been studied by Åslund et al. (2009) and Böhlmark (2008, 2009). They find that age at immigration is important for education outcomes but less so for long-term labour market outcomes. Böhlmark (2009) finds a significant negative effect on male wages at the age of 30 of having immigrated at age 13-16 (compared to before school age) but not on employment or female wages. Åslund et al. (2009) estimate wages and employment jointly for women and men and find a significant negative effect of being a year older at immigration on employment but not on wages.

Swedes with parents from Yugoslavia, Southern Europe and Turkey, since these three subsamples are large enough for analysis to be meaningful. (We have fused those with a background in the Nordic countries, Eastern and Western Europe, the US and Oceania after a first round of estimates which showed rather small differences between them.)

Descriptive statistics of mean age, mean monthly wages and average years and levels of schooling, the frequency of over- and undereducation as well as years of over/under-education for those who are over/undereducated within each country of origin category are discussed in section 6, below. They are reported in Table 2 a, Table 2 b, Figure 2 A and Figure 2 B.

In the original data from Statistics Sweden there are 27 country or region categories. We have amalgamated a few of them which were both geographically close and similar in terms of (adjusted) wages and returns to education. Thus, the childhood immigrants are divided into 18 groups, 5 of which pertain to a single country while the others include several countries that are geographically close to each other. The countries that have their own individual codes are transmitter countries which are strongly represented in the data. For the precise coding and the names we have assigned to groups of countries, see Appendix A which also indicates the number of observations in each category.[11] The reference category is those with at least one parent born in Sweden. [12]

Most of the labour immigrants of 1950-80 were from Finland, Yugoslavia, Turkey and Greece. From the 1980s onwards most immigrants were refugees – from Latin America, the Middle East, Africa and former Yugoslavia.[13] The groups who were labour market immigrants tended to arrive earlier than those who were refugees and their children have higher average age. In order to make the samples of childhood immigrants from different countries more similar to each other and to the native Swedes in terms of age, we restricted the analysis to individuals under the age of 50 years. We

[11] If these descriptive names are to be reasonably short, they cannot be completely exact. (For instance, we have named the group which consists of Sudan, Ethiopia, Somalia and Eritrea "Horn of Africa" even though the first country should not be included under that name. Since Chile has a separate code what we call "Latin America" is in fact "Latin America except Chile".

[12] Unlike several earlier studies, we have placed those with one, and those with two, parents born in Sweden in the same category since the descriptive statistics indicated that these two groups were very similar in terms of labour market characteristics and outcomes. Furthermore, it is in agreement with Statistics Sweden, which has changed the definition of "foreign background" in the published population statistics from "born in Sweden with at least one parent born abroad" to "born in Sweden with both parents born abroad. See http://www.scb.se/Pages/TableAndChart____26040.aspx

[13] In the 1960s and 1970s, the large majority of immigrants from Yugoslavia were labour immigrants, while another wave arrived as refugees from the wars following the disintegration of the country in the 1990s. Turkey is another country from which both labour immigrants and refugees have come to Sweden.

choose 25 as the lower age limit since at this age a reasonably large majority have completed their education.

As mentioned, employment rates differ considerably by origin. The children of immigrants who have wages which we can analyse are a selective sample of the children of immigrants from each country, in some cases highly selective. Table 1 shows that the highest employment rate is that of native men, 80 per cent of whom have a level of labour income indicating that they belong to the core labour force.[14] Other groups with high employment rates are male childhood immigrants from Finland (73 per cent) and Scandinavia (71 per cent). At the other end of the scale we find men from Iran or MENA, only 42 per cent of whom belong to the core labour force and from the Horn of Africa[15] (45 per cent), as well as both childhood immigrants and second generation Swedes of (49 per cent) of Turkish origin (47 per cent). Women's employment rates are lower than men's but the pattern is similar, countries geographically close to Sweden show higher proportions in the core labour force compared to those that are more distant. The highest percentage is for native women (64 per cent) and the lowest for childhood immigrant women from MENA (31 per cent), Turkey (36 per cent) and Iran (37 per cent). This selection into employment must be borne in mind when assessing the results from the analysis made with the Wage Data Base.[16]

[14] That is to say, has labour earnings of at least 138 000 SEK in 2005. This is the definition used by the National Board of Health and Welfare.

[15] The major part of immigration from the Horn of Africa, in particular from Somalia, has been relatively recent so the number of individuals who arrived in Sweden before age 16 but had reached age 25 by 2005 is not large. We therefore advice caution in interpreting any results we get concerning this group. Other categories with few observations include "Eastern Europe 2" (ex-USSR except the Baltic countries + Albania, Romania and Bulgaria) and "other Africa" (i. e. neither North Africa nor the Horn).

[16] We also estimated the probability of being in the core labour force with a logistic regression and found that, in most cases, adjusting for variables that are also included in our wage models such as education, age, children etc. reduces the gap relative to natives by roughly a half.

Table 1: Percentage belonging to the core labour force*

	MEN	WOMEN
Swedish background	80	64
Second generation		
Europe	73	59
Former Yugoslavia	66	54
Southern Europe	62	45
Turkey	49	39
Outside of Europe	45	38
Childhood immigrants		
Finland	73	63
Denmark, Norway or Iceland	71	54
Former Yugoslavia	61	49
E. Europe 3 and the Baltic states	58	49
E. Europe 2	55	44
Poland	57	49
Western countries	67	56
Southern Europe	58	50
Chile	55	44
Latin America	53	46
Horn of Africa	45	40
Other Africa	55	46
MENA	42	31
Iran	42	37
Turkey	47	36
East Asia	68	56
South Asia	59	44
Other Asia	62	45

* Core labour force - having annual earnings exceeding 3.5 price base amounts

We have a very detailed classification of levels of education, SUN2000,[17] which includes 11 different levels and which we have transformed into years of school. (See Appendix C.) The coding also allows us to create dummies for field of education.

In empirical applications, three types of measures of over- and undereducation have been used, each of which has advantages and disadvantages. With Self-reporting, workers themselves assess the length of education required for their job, with Job Assessment experts analyse different occupations to determine the schooling required and with Realized Matches-measures over- and undereducation are defined relative to the mean or modal education of workers in the occupation. Self-reporting is up-to-date and specific to each worker's job but is subjective and may be biased. Since it can only

[17] Similar to ISCED 97 For the exact coding and the years of education we have ascribed to the levels defined in SUN2000, see Appendix C

be obtained through questionnaires, the cost of gathering data restricts sample size. Job-Assessments can be used with register data; they are objective and uniform but can only refer to occupational codings which may cover jobs requiring different lengths of schooling and they tend to be updated infrequently. The Realized Matches approach is perhaps the weakest since it reflects hiring standards rather than actual job requirements. Many actually overeducated workers in an occupation raise the average level and therefore decrease overeducation as measured by Realized Matches.

The measure of mismatch used in this study is a Job Assessment measure. It relies on the SEI-coding which, despite differences in the way they are constructed, results in a classification close to that of the Erikson-Goldthorpe (EGP)-scheme (Tåhlin, 2007a).[18] In an earlier study of overeducation in Sweden, Oscarsson and Grannas (2002), a SEI-based measure is compared with one based on SSYK-1996 (which is similar to ISCO-88). According to the SSYK-based definitions, nine per cent of employees were overeducated and 35 per cent undereducated. Use of SEI resulted in 29 per cent being considered overeducated and 15 per cent undereducated. The greatest discrepancy is in occupations that are considered as requiring less than three years of upper secondary education (i.e. a total of 12 years of school) in the SEI classification while this level is necessary according to SSYK. Oscarsson and Grannas conclude that the SEI-classification, which was constructed in 1982, underestimates present day skill requirements. Studies using the Level of Living Surveys (LNU) find, however, that increases in education within job-categories over time have not been primarily due to changes in job content (le Grand et al., 2001) and that there has been an increase in overeducation in Sweden, also according to workers' self-assessment and conclude that the level of education of the work-force has increased more rapidly than the schooling requirements of jobs (le Grand et al., 2004; Tåhlin, 2007b; le Grand et al., 2013).

We therefore consider the SEI-based measure to be the best available after some modifications. First, all previous Swedish studies have ascribed the same "required education" to every occupation that requires three or more years of tertiary education. In other words, these studies would consider 15 years of education or more to be adequate for both medical nurses (who need 15 years), civil engineers (16.5 years in 2005) and physicians (17 years). We have instead used the actual length of the education for all

[18] For the EGP-scheme see Eriksson and Goldthorpe (1992). The SEI-classification and the years of schooling we have defined as adequate are described in Appendix C.

those occupations for which a specific education programme is required. Thus, in our coding the minimum required for a physician or psychologist is 17 years. Second, the reform of the Swedish system of higher education in 1993 (Högskoleförordningen:-1993) integrated a number of post-secondary education programs into universities and university colleges, including those for registered medical nurse, pre-school and primary school teacher, midwife and engineer. It also lengthened the study programs required. We have therefore modified the coding of required education to take this into account for workers who acquired their diplomas after the reform took effect.[19] Appendix B shows the proportions of overeducated workers in different categories according to the one-digit ISCO-classifications.

We control for both over- and undereducation in the wage models, but our analysis is mainly restricted to overeducation.

5 Models

We estimate four wage equations. The structure of the models is shown in graphic form in Figure 2. We do not make a correction for selection but the rates of core labour force participation for individuals with parents born in different countries which were reported in Table 1, above, give an indication of the extent of selectivity.

The first wage equation (Model 1) that is estimated is:

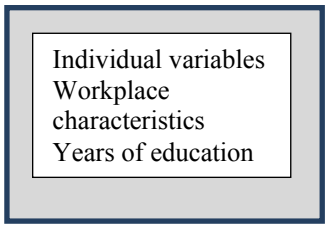
$$\ln W_i = \alpha + \beta_s s_i + \beta z_i + \gamma_2 D_2 + \gamma_3 D_3 + .. + \gamma_{24} D_{24} + \varepsilon_i \qquad (1)$$

where s_i is the years of acquired education of individual i, z_i is a vector of individual and job characteristics and D_2- $D_{24\ are}$ dummies for background country/region (the omitted D_1 represents being born in and having at least one parent born in Sweden). The vector z includes age, age squared, marital status, number of children, region of residence, three dummies for age at immigration, dummies for receiving student allowances or parental leave allowances, field of education as well as a number of job characteristics

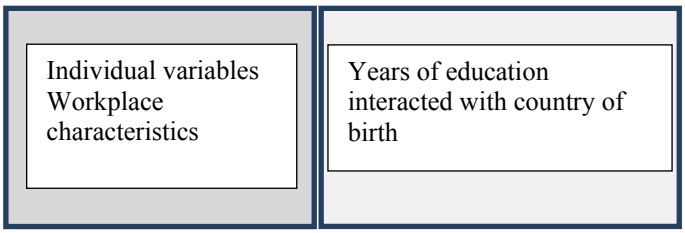
[19] Details are available from the authors.

Figure 2: Schematic overview of the wage models 1-4

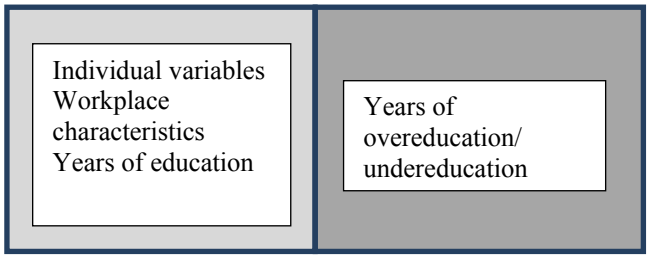
Model 1



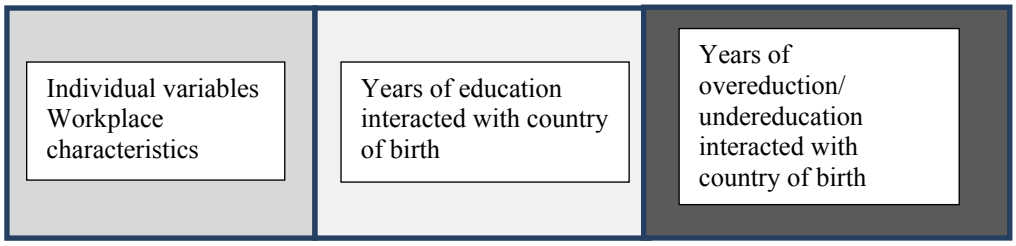
Model 2



Model 3



Model 4



(share women in the occupation, local government, central government or private sector and industry).

In Model 2 the years of schooling (s) is replaced by interaction terms between years of schooling and background. The equation becomes

$$\ln W_i = a + bz_i + m_1 s_i \times D_1 + \ldots + m_{24} s_i \times D_{24} + l_2 D_2 + \ldots l_{24} D_{24} + e_i \qquad (2)$$

Since we include the term $s_1 * D_1$, the coefficients of the interaction terms indicate the specific education premium for each country of origin-group. Its parameter, μ_1, represents the premium for a year of schooling for a person with a parent or parents born in Sweden.

In the third model, years of over- and undereducation are added to the wage equation (1). These variables were defined by:

$$u = \begin{cases} r_{\min} - s & \text{if } r_{\min} > s \\ 0 & \text{if } r_{\min} \le s \end{cases} \text{ and } y = \begin{cases} s - r_{\max} & \text{if } s > r_{\max} \\ 0 & \text{if } s \le r_{\max} \end{cases} \qquad (*)$$

where r_{min} and r_{max} are the endpoints of the interval of normally required years of education in the occupation[20]. Thus the equation for Model 3 is:

$$\ln W_i = a + b_s s_i + b_y y_i + b_u u_i + bz_i + l_2 D_2 + l_3 D_3 + .. + l_{24} D_{24} + e_i \qquad (3)$$

β_y indicates how much less a year of education adds to the wage if that year exceeds what is normally required in the occupation. From the earlier literature, it is expected to be negative but with a smaller absolute value than β_s. Analogously, β_u indicates how much more an undereducated worker earns than the average for someone with his/her

[20] For the construction of the interval for normally required years, see Appendix C.

years of schooling but an occupation that does not normally require more. It is expected to be positive but smaller than β_s.[21]

Finally, in Model 4, acquired schooling, overeducation and undereducation are all interacted with the background dummies $D_1 \ldots D_{24}$. and the equation becomes

$$\ln W_i = a + bz_{ii} + m_1 s_i \times D_1 + \ldots + m_{24} s_i \times D_{24} + n_1 u_i \times D_1 + \ldots + n_{24} u_i \times D_{24} + \\ + k_1 y_i \times D_1 + \ldots + k_{24} y_i \times D_{24} + l_2 D_2 + \ldots l_{24} D_{24} + e_i \qquad (4)$$

Each of the equations (1) - (4) was estimated separately for women and men.

6 Descriptive statistics

In this and the following sections, all results will refer to our sample, i.e. those who are included in the Wage Data Base and 25-49 years old, excluding immigrants who arrived in Sweden later than at age 15.

Most groups of both childhood immigrants and second generation Swedes have lower average wages than employees of the same gender with parents born in Sweden. In all cases, the wage differential between children of immigrants and those without immigrant background are smaller for women than for men. Childhood immigrants, both male and female, from Western countries, East and Central Europe (Eastern Europe 2) and East Asia[22] earn about as much as, or more than, natives. For women, this is also the case for those from other parts of Eastern Europe and the former USSR as well as Southern Europe. Most of the groups of childhood immigrants from Asia, Africa and Latin America earn, on average, 10-15 per cent less than natives of the same gender. Those from Iran do slightly better than this, but the wages of men from the Horn of Africa and of men born in Sweden with Turkish parents are nearly 20 per cent lower than those of native men. The wages of childhood immigrants from Turkey are lower than those from other labour migrant transmitters and closer to those of others

[21] In the majority of studies instead of actual years of schooling, the required level is included in the wage equations. Logically, the models are equivalent but a simple transformation is necessary if one wants to compare the parameters. Since SEI does not assign a unique number of required years of schooling to occupations, we prefer to use years of actual education.

[22] A large majority in this group arrived in Sweden at a very early age and there is no information on the birth-country of parents. We assume that most of them are adoptive children and their situation is different from children in immigrant families. We have chosen not to focus on this group.

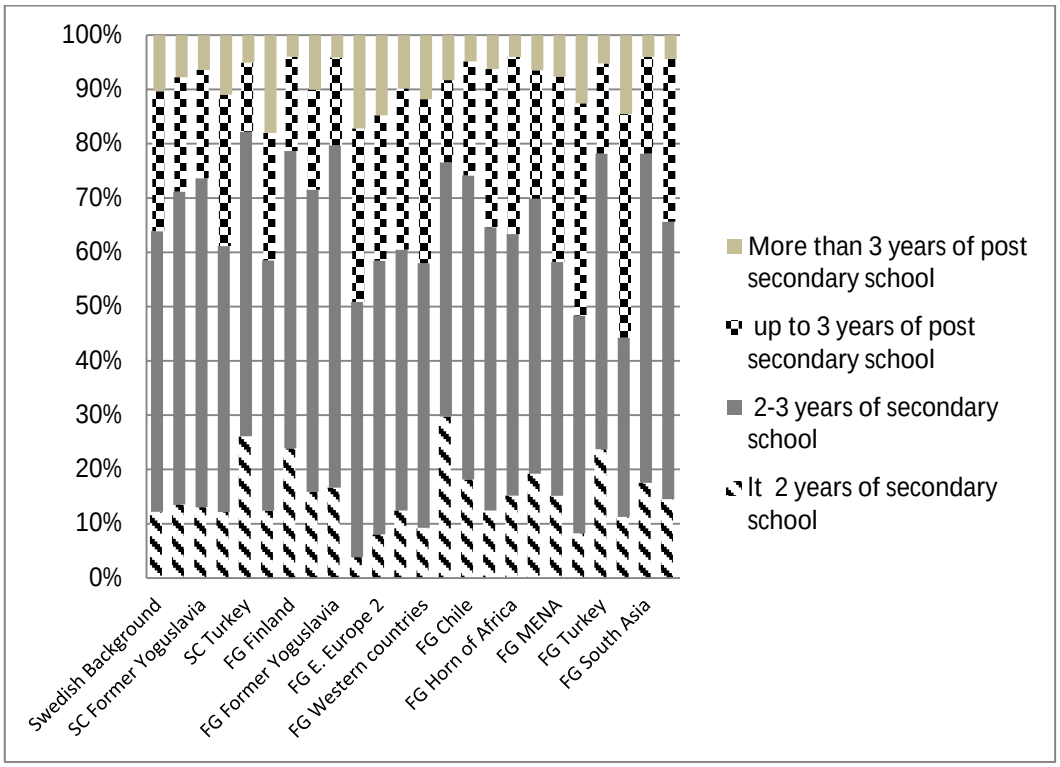
from the Global South. Wages of second generation Swedes are in some cases higher than those of childhood immigrants, in others lower.

Levels of education vary substantially according to country of origin, as can be seen from Figure 2 A and Figure 2 B. At one end of the scale are the highly educated childhood immigrants from East and Central Europe and Iran, at the other those with parents from Turkey, Finland, former Yugoslavia and Southern Europe. For example, nearly 30 per cent of the men born in Southern Europe, and 17 per cent of the women, have less than two years of secondary education, as do nearly 24 per cent of the men and 21 per cent of the women from Turkey.[23] These numbers should be compared with about 12 per cent of men with Swedish background and 10 per cent of the women. While participation in the labour market decreased with distance from Sweden, this is not at all of the case for level of education. Immigrants from countries geographically close to each other display differing characteristics. Childhood immigrants from Iran have a higher percentage with long post-secondary education, as well as more average years of schooling, than employees with Swedish-born parents. Of those from MENA fewer have attained three years or more of post-secondary education than among natives but a larger share have short post-secondary schooling.

The proportion that is overeducated is larger among most groups of childhood immigrants than among native Swedes, among both women and men, but with large differences according to origin. In most cases, overeducation among those from "the labour migration countries" is at levels similar to those among native Swedes. The great exception is men born in Turkey, nearly half of whom are overeducated according to the definition we apply. It is more frequent among those with non-European, non-Western origin, in particular those with a Middle Eastern background. The Swedish-born children of labour immigrants also tend to have higher frequencies of overeducation than those with native parents – and in several cases higher than those who immigrated as children. Undereducation is less frequent among those with immigrant background than among those without, with a few exceptions.

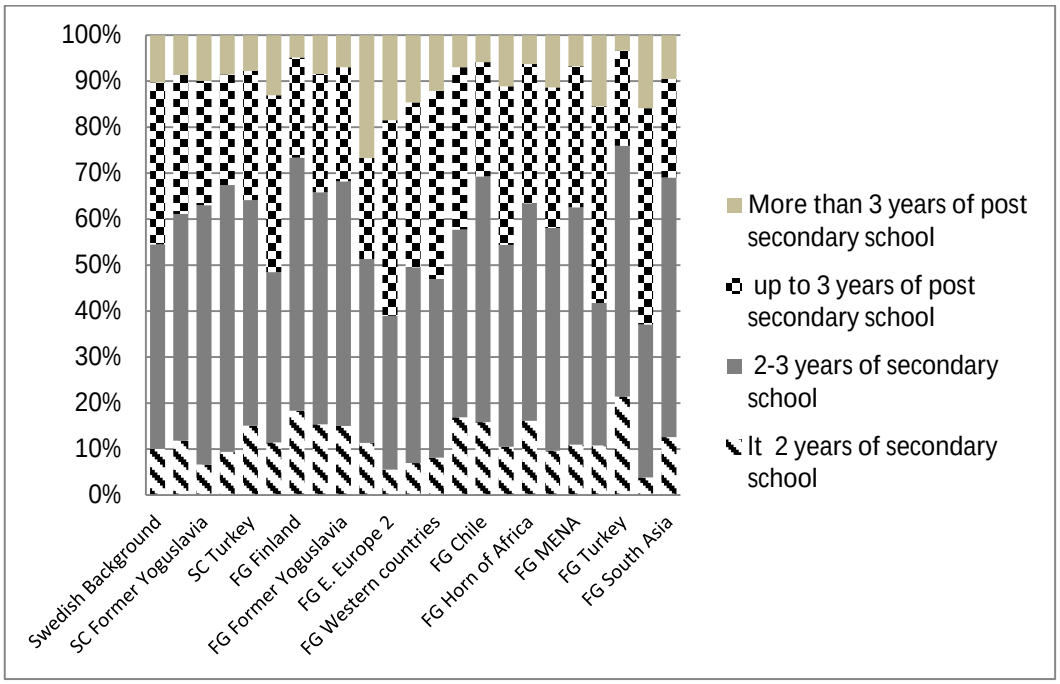
[23] The children of Southern European immigrants born in Sweden have more education than the childhood immigrants but for men with Turkish parents the difference is very small.

Figure 2 A: Level of education by country of origin (Men)



SC = second generation, FG= childhood immigrants

Figure 2 B: Level of education by country of origin (Women)



SC = second generation, FG= childhood immigrants

Table 2 a: Sample characteristics. Average age, monthly full-time wage, years of schooling (YSCH), share over- and undereducated (OED and UED), years of over- and undereducation if > zero (YOED and YUED). Men

	AGE	WAGE*	YSCH	OED	UED	YOED	YUED
Swedish Background	37	26719	12.3	26%	18%	1.8	2.1
Second generation:							
Europe	37	26091	12.0	28%	16%	1.7	2.0
Former Yugoslavia	32	23964	12.1	41%	11%	1.9	2.1
Southern Europe	34	25486	12.4	31%	25%	1.9	1.9
Turkey	29	21405	11.6	30%	14%	1.9	2.3
Outside of Europe	28	23141	12.9	45%	11%	2.2	2.0
Childhood immigrants:							
Finland	41	25044	11.4	25%	22%	1.4	2.1
Denmark, Norway or Iceland	39	25844	12.0	26%	13%	1.5	2.3
Former Yugoslavia	36	23979	11.7	34%	12%	1.8	2.0
E. Europe 3 and the Baltic states	36	29601	13.2	28%	14%	1.9	2.2
E. Europe 2	30	24448	12.9	42%	12%	2.1	1.8
Poland	33	25658	12.5	31%	13%	2.1	2.0
Western countries	36	26569	12.7	30%	21%	1.9	2.4
Southern Europe	40	24823	11.6	26%	30%	1.6	2.2
Chile	31	22203	11.9	35%	20%	1.8	2.1
Latin America	32	22695	12.4	33%	17%	2.1	2.1
Horn of Africa	30	21543	12.3	37%	10%	2.0	1.9
Other Africa	33	23210	12.0	33%	10%	1.8	1.9
MENA	29	22558	12.6	47%	11%	1.7	1.9
Iran	29	24363	13.2	41%	15%	2.6	2.2
Turkey	36	22287	11.6	47%	15%	1.6	2.3
East Asia	33	27708	13.0	25%	20%	2.3	1.7
South Asia	30	22533	11.8	38%	14%	2.0	1.8
Other Asia	29	22335	12.3	39%	19%	2.4	1.9

* Full time monthly wage

Table 2 b: Sample characteristics. Average age, monthly full-time wage, years of schooling, share over- and undereducated, years of over- and undereducation if > zero
Women

	AGE	WAGE*	YSCH	OED	UED	YOED	YUED
Swedish Background	38	22490	12.8	24%	16%	1.9	1.7
Second generation:							
Europe	38	22216	12.5	24%	15%	1.9	1.7
Former Yugoslavia	32	21414	12.7	34%	13%	2.0	1.7
Southern Europe	33	21997	12.5	30%	13%	1.9	1.8
Turkey	28	20907	12.5	34%	12%	2.2	1.6
Outside of Europe	28	20571	13.2	35%	8%	2.4	1.7
Childhood immigrants:							
Finland	41	21459	11.9	23%	15%	1.5	1.9
Denmark, Norway or Iceland	38	21404	12.3	20%	21%	1.7	1.9
Former Yugoslavia	36	21096	12.2	27%	12%	1.8	1.7
E. Europe 3 and the Baltic states	36	25143	13.5	19%	7%	3.1	1.7
E. Europe 2	30	22877	13.7	36%	10%	2.6	1.7
Poland	33	22467	13.2	27%	11%	2.3	1.8
Western countries	37	24403	13.0	29%	25%	2.0	1.5
Southern Europe	39	24471	12.4	19%	16%	1.6	2.0
Chile	32	20379	12.3	26%	13%	2.0	2.1
Latin America	32	21713	12.9	29%	11%	2.0	1.9
Horn of Africa	31	20445	12.4	23%	6%	2.2	2.2
Other Africa	33	21551	12.8	25%	12%	2.2	1.9
MENA	31	20384	12.6	40%	10%	2.0	1.9
Iran	29	21014	13.4	32%	9%	2.5	1.8
Turkey	34	20119	11.8	21%	23%	1.9	1.9
East Asia	34	23211	13.6	37%	12%	2.5	1.6
South Asia	31	19276	12.4	49%	7%	1.7	1.6
Other Asia	29	19653	12.9	39%	9%	2.2	1.6

* Full time monthly wage

7 Wage differentials and returns to education

7.1 Wage differentials according to country of birth

In this section we will report and discuss results from estimations of the four wage models described in section 5 above. Parameters for country of origin from the four different wage equations are reported in Table 3 A and Table 3 B. The table also shows the coefficients for years of acquired, over- and undereducation in Models 1 and 3. In the first model, with country-of-origin intercepts and years of schooling, but no interaction between origin and education and no variables for over- and undereducation, nearly all other male groups have significantly lower adjusted wages than native Swedish men. Only Eastern Europe 2 and 3 and Iran have positive parameters. Otherwise, the adjusted wage differential is in the order of 2-3 per cent – except for larger values for Turkey (-15 per cent) and Southern Europe (-8 per cent) and MENA (-6 per cent). (The Swedish born sons of Southern European and Turkish immigrants also have lower, adjusted wages than natives, but less so than the childhood immigrants.) There is no obvious pattern to the differing intercepts.

The countries with the largest negative intercepts, Southern Europe and Turkey are, as mentioned, associated with early labour immigration and low average level of education. But this is also true for Finland and, partly, for ex-Yugoslavia and variables for these two groups have considerably smaller negative parameters, of a size comparable to that for many other background countries. Descriptive statistics at the background country level show that men with Turkish background are over-represented in the *Wholesale and retail trade* and *the hotels and restaurants* industries compared not only to natives but also to other immigrant groups. Men from several other low-paid immigrant groups are overrepresented in the public sector and in female dominated occupations while the Turkish immigrants are not. They are mainly employed in the private sector.

Table 3 A: Coefficients for country/region of origin in wage equations for men (Prob-values in italics)

	Model 1		**Model 2**		**Model 3**		**Model 4**	
	coeff.	*p*	coeff.	p	coeff.	p	coeff.	p
Second generation								
Europe	-0.013	*0.000*	-0.045	*0.000*	-0.006	*0.000*	-0.020	*0.044*
Former Yugoslavia	-0.021	*0.000*	0.128	*0.000*	0.001	*0.809*	0.177	*0.000*
Southern Europe	-0.039	*0.000*	0.218	*0.000*	-0.037	*0.000*	0.344	*0.000*
Turkey	-0.109	*0.000*	-0.010	*0.860*	-0.102	*0.000*	0.007	*0.895*
Outside of Europe	-0.088	*0.000*	0.175	*0.002*	-0.071	*0.000*	0.222	*0.000*
Childhood immigrants								
Finland	-0.030	*0.000*	-0.021	*0.152*	-0.024	*0.000*	-0.018	*0.245*
Denmark0. Norway or Iceland	-0.006	*0.215*	-0.122	*0.000*	-0.002	*0.607*	-0.100	*0.000*
Former Yugoslavia	-0.019	*0.000*	0.138	*0.000*	-0.007	*0.162*	0.098	*0.002*
E0. Europe 3 and Baltic states	0.043	*0.000*	-0.048	*0.449*	0.040	*0.000*	-0.110	*0.076*
E0. Europe 2	0.022	*0.050*	0.048	*0.466*	0.031	*0.005*	0.094	*0.142*
Poland	-0.004	*0.538*	-0.052	*0.194*	0.002	*0.777*	-0.042	*0.284*
Western countries	-0.036	*0.000*	-0.004	*0.898*	-0.043	*0.000*	0.058	*0.041*
Southern Europe	-0.085	*0.000*	-0.167	*0.000*	-0.083	*0.000*	-0.124	*0.008*
Chile	-0.022	*0.001*	0.192	*0.000*	-0.021	*0.001*	0.211	*0.000*
Latin America	-0.031	*0.000*	0.272	*0.000*	-0.023	*0.000*	0.311	*0.000*
Horn of Africa	-0.023	*0.045*	0.288	*0.000*	-0.012	*0.263*	0.337	*0.000*
Other Africa	-0.031	*0.016*	-0.136	*0.062*	-0.019	*0.127*	-0.062	*0.373*
MENA	-0.060	*0.000*	0.297	*0.000*	-0.055	*0.000*	0.331	*0.000*
Iran	0.020	*0.009*	0.346	*0.000*	0.032	*0.000*	0.325	*0.000*
Turkey	-0.160	*0.000*	-0.200	*0.000*	-0.133	*0.000*	-0.257	*0.000*
East Asia	0.010	*0.183*	0.203	*0.000*	0.009	*0.193*	-0.001	*0.983*
South Asia	-0.017	*0.011*	0.159	*0.000*	-0.007	*0.248*	0.181	*0.000*
Other Asia	-0.027	*0.000*	0.316	*0.000*	-0.011	*0.081*	0.175	*0.000*
Years of schooling	0.069	*0.000*			0.080	*0.000*		
Years of overeducation	No		No		-0.066	*0.000*		
Years of undereducation	No		No		0.051	*0.000*		
Education*country interactions	No		Yes		No		Yes	
Mismatch*country interactions	No		No		No		Yes	

Dependent variable: Logarithm of monthly full-time wage.

Covariates: age, age squared, years of schooling, marital status, number of children, region of residence, three dummies for age at immigration, dummies for receiving student allowances, parental leave allowances and a number of work place characteristics (share women, local government, central government or private sector and industry

Table 3 B: Coefficients for country/region of origin in wage equations for women (Prob-values in italics)

	Model 1		**Model 2**		**Model 3**		**Model 4**	
	coeff.	*p*	coeff.	p	coeff.	p	coeff.	p
Second generation								
Europe	-0.016	*0.000*	0.014	*0.092*	-0.013	*0.000*	0.027	*0.001*
Former Yugoslavia	-0.014	*0.000*	0.028	*0.243*	-0.006	*0.081*	0.070	*0.003*
Southern Europe	-0.039	*0.000*	-0.034	*0.379*	-0.032	*0.000*	-0.037	*0.332*
Turkey	-0.006	*0.393*	0.387	*0.000*	0.000	*0.999*	0.438	*0.000*
Outside of Europe	-0.044	*0.000*	0.075	*0.082*	-0.039	*0.000*	0.083	*0.047*
Childhood immigrants								
Finland	-0.023	*0.000*	-0.056	*0.000*	-0.017	*0.000*	-0.046	*0.000*
Denmark, Norway or Iceland	-0.024	*0.000*	-0.008	*0.707*	-0.029	*0.000*	0.046	*0.027*
Former Yugoslavia	0.003	*0.519*	0.020	*0.358*	0.007	*0.058*	0.057	*0.009*
E, Europe 3 and Baltic states	0.018	*0.011*	-0.229	*0.000*	0.019	*0.007*	-0.303	*0.000*
E, Europe 2	0.008	*0.418*	-0.116	*0.051*	0.017	*0.051*	-0.069	*0.237*
Poland	0.009	*0.091*	0.040	*0.233*	0.010	*0.068*	0.039	*0.237*
Western countries	0.029	*0.000*	0.065	*0.003*	0.026	*0.000*	-0.072	*0.001*
Southern Europe	0.039	*0.000*	-0.128	*0.001*	0.037	*0.000*	-0.121	*0.001*
Chile	-0.019	*0.000*	0.193	*0.000*	-0.018	*0.000*	0.216	*0.000*
Latin America	0.002	*0.641*	0.047	*0.144*	0.003	*0.591*	0.051	*0.102*
Horn of Africa	0.006	*0.462*	0.346	*0.000*	0.013	*0.119*	0.365	*0.000*
Other Africa	-0.006	*0.542*	0.085	*0.133*	-0.004	*0.671*	0.097	*0.080*
MENA	-0.048	*0.000*	-0.038	*0.248*	-0.039	*0.000*	0.014	*0.662*
Iran	-0.015	*0.017*	0.150	*0.000*	-0.016	*0.006*	0.145	*0.000*
Turkey	-0.061	*0.000*	-0.037	*0.240*	-0.060	*0.000*	0.017	*0.615*
East Asia	-0.010	*0.005*	0.192	*0.000*	0.000	*0.918*	0.132	*0.000*
South Asia	-0.081	*0.000*	-0.063	*0.044*	-0.071	*0.000*	-0.091	*0.003*
Other Asia	-0.031	*0.000*	0.000	*0.995*	-0.025	*0.000*	-0.015	*0.605*
Years of schooling	0.053	*0.000*			0.063	*0.000*		
Years of overeducation	No		No		-0.050	*0.000*		
Years of undereducation	No		No		0.036	*0.000*		
Education*country interactions	No		Yes		No		yes	
Mismatch*country interactions	No		No		No		Yes	

See note for Table 3 A.

Among women, eight groups of childhood immigrants have higher adjusted wages than those with parents born in Sweden but it is only for those with a background in Western countries and Eastern Europe 3 that the parameter is positive and significant. For all the other Eastern European groups, for the Latin American except Chilean and for the African (with rather few observations) the parameter is not significantly different from

zero. Female childhood immigrants from the Nordic countries, from the Middle East, including Turkey and Iran, and Asia earn less than comparable native Swedes. The differential ranges from 1.5 per cent to 8 per cent but there is no immediately obvious geographical pattern – the parameter for Chile is –0.02 (similar to the Nordic countries) while that for the rest of Latin America is 0.002 and not significant and the parameter for Iran is – 0.015 while that for the MENA countries is -0.05 and for Turkey it is -0.06.

A comparison of childhood immigrants, from the same country, with different levels of schooling showed that the proportion that are in the core labour force increases with education, for both women and men. For those groups whose employment rates are low, this selection into employment according to education is more pronounced than for natives, particularly among males. If there is a positive selection also when it comes to unobservable productive characteristics and if it is larger for groups with low participation rates, then the country-origin coefficients we find are very conservative estimates, something of a lower limit of the unequal outcomes for workers with immigrant background.

Most studies of immigrants' earnings in Sweden find much more dramatic disadvantages relative to native Swedes. A main reason why our results differ from theirs is that we restrict the analysis to people who arrived as children. (Compare Nordin, 2011, and Chiswick and Miller, 2008, on the difference between childhood and adult immigration.) But another contributory cause is that, unlike most of these studies we analyse a wage *rate* – while most earlier studies use yearly earnings, above a certain cut-off value (Rooth and Ekberg, 2003; Behtoui, 2004; Nordin, 2011; Nordin and Rooth, 2009b), but otherwise uncorrected for hours worked. In addition, we do not only control for individual but also for job characteristics, such as share of women in the occupation, industry and sector (private, central government, county and municipal).

7.2 Returns to education

Model 2 is an extension of Model 1. It does not include mismatch but allows the returns to schooling to vary according to country of origin. The first two columns of Table 4 A and Table 4 B show the parameters for the interaction terms between schooling and country background, i. e. country-specific returns to education.[24] As in a large number

[24]More precisely, what we measure are, of course, partial effects on earnings of a year of schooling.

of international studies[25], we find that returns to education do vary according to origin. Among men they are lowest for those born in MENA, Iran, Latin America and the Horn of Africa. For these groups of men, returns to education vary between 4 and 5 per cent, while for native men the estimate is just under 7 per cent. For men born in Europe, North America and Oceania, Turkey and Africa except the Horn, the estimates are on a par with, or slightly larger than, those for natives. Swedish-born sons of immigrants from Southern Europe and outside Europe also receive conspicuously low returns to education.[26] Among women, the lowest returns to education are found for the childhood immigrants from the Horn of Africa, Chile, East Asia27 and Iran, while those for women from Eastern and Southern Europe are higher than for native women. The lowest estimate of all is for Swedish-born daughters of Turkish immigrants.

Smaller coefficients for years of schooling for immigrants than for natives could be due either to relatively high wages among immigrants with low education or to relatively low wages among immigrants with high education. We calculated the average wages of those with less than upper secondary education and those with at least three years of post-secondary education in each of our childhood immigrant groups. Inspection indicated that in the groups with particularly low returns to schooling, the university educated had remarkably low average wages.[28] Hence, we suspect that the low returns to education for some immigrant background groups are due to low wages among highly educated immigrants.[29]

[25] See Chiswick and Miller, (2008), and references cited therein.
[26] These education premia reflect the difference that schooling makes within the ethnic group. For a comparison between groups, both education premia and the country intercepts need to be taken into account.
[27] A large majority in this group arrived in Sweden at a very early age and there is no information on the birth-country of parents. We assume that most of them are adoptive children and their situation is different from children in immigrant families. We have chosen not to focus on this group.
[28] This was confirmed by estimates of the correlation between average wages of workers with high education and the estimated education premia. Results are available from the authors.
[29] There was a statistically significant correlation between the estimated returns to education for a group and the average wage of the members of it who had high education but not a significant negative correlation between the education premium and the average wage of those with low education.

Table 4 A: Country-specific coefficients for acquired. over- and undereducation from regressions of log full-time monthly wages. Men
(Prob-values in italics)

	Years of acquired education				**Years of over-education**		**Years of under-education**	
	Model 2		Model 4		Model 4		Model 4	
Sweden	0.069	*0.000*	0.081	*0.000*	-0.066	*0.000*	0.052	*0.000*
Second generation								
Europe	0.072	*0.000*	0.082	*0.000*	-0.062	*0.000*	0.040	*0.000*
Former Yugoslavia	0.057	*0.000*	0.065	*0.000*	-0.044	*0.000*	0.034	*0.000*
Southern Europe	0.049	*0.000*	0.052	*0.000*	-0.062	*0.000*	-0.002	*0.798*
Turkey	0.061	*0.000*	0.069	*0.000*	-0.024	*0.005*	0.057	*0.000*
Outside of Europe	0.049	*0.000*	0.056	*0.000*	-0.043	*0.000*	0.041	*0.004*
Childhood immigrants								
Finland	0.069	*0.000*	0.081	*0.000*	-0.080	*0.000*	0.045	*0.000*
Denmark, Norway or Iceland	0.079	*0.000*	0.090	*0.000*	-0.086	*0.000*	0.054	*0.000*
Former Yugoslavia	0.056	*0.000*	0.072	*0.000*	-0.069	*0.000*	0.035	*0.000*
E, Europe 3 and Baltic states	0.077	*0.000*	0.089	*0.000*	-0.021	*0.039*	0.107	*0.000*
E. Europe 2	0.068	*0.000*	0.075	*0.000*	-0.041	*0.000*	0.042	*0.006*
Poland	0.074	*0.000*	0.083	*0.000*	-0.041	*0.000*	0.057	*0.000*
Western countries	0.067	*0.000*	0.074	*0.000*	-0.053	*0.000*	0.010	*0.021*
Southern Europe	0.077	*0.000*	0.086	*0.000*	-0.083	*0.000*	0.029	*0.001*
Chile	0.052	*0.000*	0.061	*0.000*	-0.049	*0.000*	0.039	*0.000*
Latin America	0.045	*0.000*	0.054	*0.000*	-0.043	*0.000*	0.013	*0.073*
Horn of Africa	0.045	*0.000*	0.051	*0.000*	-0.033	*0.001*	0.016	*0.306*
Other Africa	0.078	*0.000*	0.083	*0.000*	-0.035	*0.004*	0.055	*0.003*
MENA	0.041	*0.000*	0.048	*0.000*	-0.037	*0.000*	0.061	*0.000*
Iran	0.045	*0.000*	0.057	*0.000*	-0.047	*0.000*	0.039	*0.000*
Turkey	0.073	*0.000*	0.092	*0.000*	-0.078	*0.000*	0.077	*0.000*
East Asia	0.055	*0.000*	0.080	*0.000*	-0.067	*0.000*	0.123	*0.000*
South Asia	0.055	*0.000*	0.066	*0.000*	-0.062	*0.000*	-0.014	*0.140*
Other Asia	0.042	*0.000*	0.065	*0.000*	-0.068	*0.000*	0.071	*0.000*

Table 4 B: Country-specific coefficients for acquired. over- and undereducation from regressions of log full-time monthly wages. Women
(Prob-values in italics)

	Years of acquired education				**Years of over-education**		**Years of under-education**	
	Model 2		Model 4		Model 4		Model 4	
Sweden	0.054	*0.000*	0.063	*0.000*	-0.050	*0.000*	0.036	*0.000*
Second generation								
Europe	0.051	*0.000*	0.059	*0.000*	-0.042	*0.000*	0.031	*0.000*
Former Yugoslavia	0.050	*0.000*	0.056	*0.000*	-0.036	*0.000*	0.019	*0.000*
Southern Europe	0.053	*0.000*	0.066	*0.000*	-0.116	*0.000*	0.029	*0.000*
Turkey	0.022	*0.000*	0.027	*0.000*	-0.020	*0.000*	-0.011	*0.290*
Outside of Europe	0.045	*0.000*	0.052	*0.000*	-0.025	*0.000*	0.021	*0.103*
Childhood immigrants								
Finland	0.056	*0.000*	0.065	*0.000*	-0.060	*0.000*	0.038	*0.000*
Denmark, Norway or Iceland	0.052	*0.000*	0.058	*0.000*	-0.052	*0.000*	-0.007	*0.079*
Former Yugoslavia	0.052	*0.000*	0.059	*0.000*	-0.042	*0.000*	0.014	*0.015*
E. Europe 3 and Baltic states	0.072	*0.000*	0.085	*0.000*	-0.033	*0.000*	0.084	*0.000*
E.. Europe 2	0.063	*0.000*	0.069	*0.000*	-0.041	*0.000*	0.027	*0.081*
Poland	0.051	*0.000*	0.060	*0.000*	-0.030	*0.000*	0.035	*0.000*
Western countries	0.051	*0.000*	0.070	*0.000*	-0.071	*0.000*	0.090	*0.000*
Southern Europe	0.067	*0.000*	0.076	*0.000*	-0.077	*0.000*	0.038	*0.000*
Chile	0.036	*0.000*	0.042	*0.000*	-0.017	*0.000*	0.033	*0.000*
Latin America	0.050	*0.000*	0.058	*0.000*	-0.028	*0.000*	0.048	*0.000*
Horn of Africa	0.026	*0.000*	0.033	*0.000*	-0.021	*0.006*	0.032	*0.014*
Other Africa	0.047	*0.000*	0.054	*0.000*	-0.035	*0.000*	0.040	*0.002*
MENA	0.053	*0.000*	0.060	*0.000*	-0.064	*0.000*	0.019	*0.015*
Iran	0.041	*0.000*	0.049	*0.000*	-0.036	*0.000*	0.070	*0.000*
Turkey	0.052	*0.000*	0.055	*0.000*	0.003	*0.622*	0.030	*0.000*
East Asia	0.039	*0.000*	0.055	*0.000*	-0.071	*0.000*	0.018	*0.002*
South Asia	0.052	*0.000*	0.065	*0.000*	-0.067	*0.000*	0.048	*0.000*
Other Asia	0.051	*0.000*	0.061	*0.000*	-0.036	*0.000*	0.031	*0.000*

We control for field of education in the model and therefore the lower returns to education for immigrants should not be due to their choices of area of education.

Our results differ substantially from those of Nordin (2011) who finds higher returns to education among workers who immigrated as children – in particular those from outside Europe – than for natives. A difference between Nordin's study and the present one is the aggregation of transmitter countries. Nordin includes immigrants from all non-European (non-OECD) countries in one category and fuses those from Southern and Eastern Europe into one. As can be seen in our estimates, this ignores very substantial heterogeneity between individuals from different birth-countries.

A second important difference is that Nordin estimates yearly earnings for those whose labour income is above a quite low threshold (SEK 60 000) which does not require full-year, full-time employment. Higher education is associated with lower unemployment and higher employment rates, among immigrants as well as natives (Ekberg, 2011; Lundström 2010). Our estimates represent the difference in how much less employers reward the schooling of childhood immigrants whom they employ, whereas Nordin's result reflect a combination of the extent of employment and the wage rate.

Addition of country-specific education premia to the model shifts the country-intercepts rather drastically. For all groups of men whose returns to education were at least 1.5 percentage points below those for native men, and for all groups of women whose returns to education were below those of native women, country intercepts in Model 2 are positive. In several cases they are quite large - in the order of 20-30, or even 40 percentage points. Obviously, these country intercepts should not be interpreted on their own but only together with the country-specific education premia.[30] If a country coefficient is less negative in Model 2 than in Model 1, or negative in Model 1 but positive in Model 2, this implies that difference in returns to education is a mechanism behind the wage gap between this group and those with Swedish-born parents.

Generally, we can conclude that some of the earnings disadvantage of workers with a non-European background takes the form of lower returns to education. It is more difficult for them to compensate for labour market disadvantage through acquiring more education than it would be if their education was rewarded equally with that of native Swedes. For example, in the group born i Iran, both men and women, have longer average education than natives, but nevertheless have lower (unadjusted) wages. Men from MENA, who have somewhat longer schooling than native men, and women from MENA who have only little less than native women, have lower adjusted wages according to Model 1. In both cases, low education premia are one mechanism that tends to depress these immigrants' wages. Childhood immigrants from Turkey and Southern Europe – both of which are labour migration transmitters – have higher returns to education than natives, however, and this decreases their wage disadvantage relative to natives.

[30] Formally they could be interpreted as "the adjusted country differential for individuals with zero years of schooling" but this is extrapolating well beyond the interval of observed values and not advisable.

8 Childhood immigrants and education-occupation mismatch

8.1 Probabilities of overeducation

As was seen in section 6, above, many groups of childhood immigrants have higher frequencies of overeducation, and lower frequencies of undereducation, than those with Swedish-born parents. There are, however, many differences in the characteristics of groups of different origin which could be correlated with over- and undereducation. Therefore, we estimated multinomial logistic regressions in which we controlled for age, level and field of education, age at immigration, region of residence, marital status and number of children. The chosen covariates represent the human capital with which the individual *enters* the labour market, while we have excluded variables that reflect labour outcomes that could be correlated with education-occupation mismatch, such as industry, sector or occupation.

Table 5 A and Table 5 B shows that, among men, only Scandinavians have an odds-ratio (slightly) below one for being overeducated, relative to native Swedes. For 12 out of 18 groups of male childhood immigrants the odds-ratio is significantly larger than one. They exceed two for two groups, those from Turkey and MENA. For those born in Sweden with Turkish parents, the odds are not significantly higher than for natives, but the Swedish born children of Southern European or Yugoslav background run a higher risk than the childhood immigrants. As to undereducation, the odds-ratios for the childhood immigrants are larger than one in six cases; not significantly different from one in seven cases; and less than one in five. (The total range is 0.54-1.60).

Table 5 A: Odds-ratios relative to workers with Swedish-born parents from multinomial logistic regression. Dependent variable: adequately, over- or under-educated. The reference is adequately educated. Men

Origin	Odds-ratio for being under-educated	95 % Confidence interval for exp(B)		Odds-ratio for being over-educated	95 % Confidence interval for exp(B)	
		Lower bound	*Upper bound*		*Lower bound*	*Upper bound*
Second generation						
Europe	0.84	*0.81*	*0.88*	1.04	*1.01*	*1.07*
Former Yugoslavia	0.69	*0.62*	*0.77*	1.48	*1.38*	*1.59*
Southern Europe	1.60	*1.35*	*1.89*	1.48	*1.27*	*1.73*
Turkey	0.54	*0.43*	*0.68*	1.08	*0.91*	*1.28*
Outside of Europe	0.85	*0.64*	*1.13*	1.60	*1.33*	*1.93*
Childhood immigrants						
Finland	1.13	*1.06*	*1.19*	1.13	*1.07*	*1.19*
Denmark, Norway or Iceland	0.69	*0.60*	*0.78*	0.89	*0.80*	*0.98*
Former Yugoslavia	0.75	*0.65*	*0.85*	1.21	*1.10*	*1.33*
E. Europe 3 and Baltic states	1.09	*0.82*	*1.46*	1.06	*0.84*	*1.33*
E. Europe 2	1.24	*0.91*	*1.69*	1.53	*1.25*	*1.88*
Poland	0.80	*0.66*	*0.96*	1.10	*0.96*	*1.26*
Western countries	1.62	*1.45*	*1.82*	1.27	*1.15*	*1.40*
Southern Europe	1.62	*1.32*	*1.99*	1.65	*1.35*	*2.02*
Chile	1.43	*1.24*	*1.66*	1.38	*1.22*	*1.56*
Latin America	1.04	*0.89*	*1.23*	1.17	*1.03*	*1.33*
Horn of Africa	0.58	*0.42*	*0.80*	1.17	*0.95*	*1.44*
Other Africa	0.52	*0.36*	*0.76*	1.14	*0.90*	*1.45*
MENA	0.91	*0.75*	*1.10*	2.27	*2.00*	*2.56*
Iran	1.39	*1.14*	*1.69*	1.49	*1.29*	*1.72*
Turkey	0.89	*0.72*	*1.09*	3.23	*2.79*	*3.74*
East Asia	1.02	*0.87*	*1.21*	0.94	*0.81*	*1.09*
South Asia	0.96	*0.81*	*1.14*	1.30	*1.15*	*1.47*
Other Asia	1.37	*1.17*	*1.60*	1.53	*1.36*	*1.74*

Covariates: age in five-year interval,, level of education,, field of education,, 3 dummies for age at immigration,, region of residence,, number of children and marital status.

Among female childhood immigrants, the estimated odds-ratios for overeducation relative to native women are significantly higher than one in the cases of Western countries, MENA and Asia and significantly below one for Scandinavia, Eastern Europe 3, including the Baltic states, Poland and the Horn of Africa. The highest odds-ratio, just below two, is for those with parents from South Asia and the lowest, 0.63, for Eastern Europe 3. It is interesting to note that although the raw percentage of women

Table 5 B: Odds-ratios relative to workers with Swedish-born parents from multinomial logistic regression. Dependent variable: adequately. Over- or under- educated. The reference is adequately educated. Women

Origin	Odds-ratio for being under-educated	95 % Confidence interval for exp(B)		Odds-ratio for being over-educated	95 % Confidence interval for exp(B)	
		Lower bound	*Upper bound*		*Lower bound*	*Upper bound*
Second generation						
Europe	0.86	*0.83*	*0.90*	0.96	*0.93*	*1.00*
Former Yugoslavia	1.05	*0.92*	*1.19*	1.25	*1.14*	*1.37*
Southern Europe	0.89	*0.72*	*1.10*	1.15	*0.98*	*1.34*
Turkey	0.97	*0.77*	*1.22*	1.08	*0.92*	*1.26*
Outside of Europe	0.63	*0.47*	*0.85*	0.87	*0.73*	*1.04*
Childhood immigrants						
Finland	0.78	*0.73*	*0.83*	1.05	*1.00*	*1.11*
Denmark. Norway or Iceland	1.46	*1.31*	*1.62*	0.86	*0.77*	*0.95*
Former Yugoslavia	0.73	*0.64*	*0.84*	0.92	*0.83*	*1.02*
E. Europe 3 and the Baltic states	0.45	*0.33*	*0.62*	0.63	*0.51*	*0.78*
E. Europe 2	1.06	*0.74*	*1.53*	1.23	*0.98*	*1.56*
Poland	0.86	*0.70*	*1.06*	0.74	*0.64*	*0.86*
Western countries	1.82	*1.63*	*2.02*	1.56	*1.41*	*1.72*
Southern Europe	0.81	*0.65*	*1.00*	0.82	*0.67*	*1.00*
Chile	0.98	*0.83*	*1.16*	0.90	*0.79*	*1.02*
Latin America	0.86	*0.71*	*1.03*	0.88	*0.77*	*1.01*
Horn of Africa	0.32	*0.21*	*0.48*	0.67	*0.53*	*0.84*
Other Africa	0.90	*0.65*	*1.26*	0.79	*0.61*	*1.02*
MENA	0.92	*0.75*	*1.12*	1.63	*1.43*	*1.85*
Iran	0.80	*0.63*	*1.02*	1.01	*0.86*	*1.18*
Turkey	1.41	*1.21*	*1.64*	0.87	*0.75*	*1.01*
East Asia	1.01	*0.89*	*1.15*	1.53	*1.40*	*1.67*
South Asia	0.65	*0.52*	*0.81*	1.97	*1.74*	*2.22*
Other Asia	0.80	*0.68*	*0.94*	1.23	*1.11*	*1.35*

Covariates: age in five-year interval,, level of education,, field of education,, 3 dummies for age at immigration,, region of residence,, number of children and marital status.

with Iranian background who are overeducated is eight percentage points larger than for native Swedish women, their probability of being overeducated, when characteristics are controlled for, is not significantly higher than for native Swedes, while women born in MENA are among those with both the largest actual frequencies of overeducation and the second highest odds-ratio. Only three groups of women have significantly higher odds of being undereducated than natives, those with Western (odds-ratio 1.8), Scandinavian (1.5) and Turkish (1.4) background, while six have odds-ratios significantly below one. The lowest odds-ratio is for the Horn of Africa (0.3).

Thus, we find differences in the probability of having a job which requires more or less schooling than one's attained education between workers of different origin which are in many cases considerable and which do not fit easily into a simple geographical pattern.

8.2 Mismatch and wages

The difference between Models 1 and 3 was that the latter included variables for years of over- and undereducation. The coefficients were -0.066 for years of overeducation and 0.051 for years of undereducation in the male equation and -0.050 and 0.036, respectively, in the female. The average return to actual years schooling shifted from 0.069 to 0.080 when the mismatch-variables were added to the male equation and from 0.053 to 0.063 in the female. It appears that mismatch is an element in Swedish wage formation worth consideration. Nevertheless, inclusion of the mismatch variables induced only a small shift in the estimated country coefficients for childhood immigrants, in nearly all cases less than one percentage point. The largest shift by far, of 2.7 percentage points, is for men with a Turkish background, where the proportion that is overeducated is large.

The net wage advantage of having a year of surplus education, relative to workers in the same occupation who have only the required years of schooling, is equal to the coefficient for "actual years of schooling" plus the coefficient for "years of overeducation" (which is negative). Thus, according to Model 3, a year of overeducation adds, on average, one and a half percentage point to the wage, compared with less educated workers of the same gender in equally qualified jobs. (That is to say, 0.08-0.066 for men, and 0.063-0.050 for women, as can be seen from Table 3 A and Table 3 B)

In Model 4, years of over- and undereducation as well as years of acquired education were interacted with origin. The coefficients are reported in Table 4 A and Table 4 B. Childhood immigrants born in labour transmitter countries tend to have a slightly larger penalty for overeducation than natives and those with background in refugee transmitter countries to have a smaller. For women, the same is usually the case but not consistently. One reason for the large overeducation penalties for male childhood immigrants from the Nordic countries could be that a larger than average proportion in these groups, have two years of upper secondary school. In a number of manual jobs (in SSYK/ISCO Group 8) this would make them overeducated according to our

overeducation measure that is based on SEI.[31] If we had applied a measure based on SSYK, as Oscarsson and Grannas (2000) do, these workers would have been classified as adequately educated. If the SEI-classification is correct, these jobs do not actually require more than nine years of school, and the large penalty for overeducation would indicate that they are paid accordingly. About half of the Turkish-born men who are overeducated have two years of upper secondary school and a large proportion work in trade, hotels and catering.

Adding country specific returns to a year of education and country specific penalties for a year of overeducation from Model 4 indicates that for male groups the net result is often 1-2 percentage points. Among women the net effect is 1-3 percentage points, in most cases. Women from Eastern Europe gain more than the average from education beyond what is normal in their occupation, but so do those from Turkey and Latin America, while for several other groups the sum is practically zero. The reward for a year of undereducation is significant in the great majority of cases and, in those, has the expected sign. It varies in size from 1.0 to 12.3 per cent and there is no easily discernible pattern except that it tends to be larger for men than for women.

A way of assessing the importance of over- and undereducation education on the native-immigrant wage differentials is shown in Table 6 A and Table 6 B. For each group we have multiplied the difference between the proportion who are overeducated/undereducated in the group, first, with the wage penalty of overeducation/reward for undereducation for native Swedes (Columns 2, and 4) and, second with the group-specific coefficient (Columns 3, and 5). These products are the equivalents of the "over-education/undereducation-endowment terms" in Oaxaca decompositions, with "native Swedish parameters" and "country of origin parameters" as weights, respectively.

[31] See Appendix B for the frequency of overeducation in different SSYK/ISCO-categories.

Table 6 A: Part of the log wage differential between those with Swedish and immigrant background attributable to difference in education-occupation mismatch. Men

	Overeducation		**Undereducation**	
	Weighted by parameter for natives	Weighted by parameter for the group	Weighted by parameter for natives	Weighted by parameter for the group
Second generation:				
Europe	-0.001	0.000	-0.003	-0.002
Former Yugoslavia	-0.021	-0.014	-0.008	-0.005
Southern Europe	-0.008	-0.008	0.005	0.000
Turkey	-0.007	-0.002	-0.003	-0.003
Outside of Europe	-0.034	-0.022	-0.008	-0.006
Childhood immigrants:				
Finland	0.008	0.009	0.004	0.004
Denmark, Norway or Iceland	0.005	0.007	-0.004	-0.004
Former Yugoslavia	-0.010	-0.010	-0.007	-0.005
E. Europe 3 and the Baltic states	-0.004	-0.001	-0.004	-0.007
E. Europe 2	-0.027	-0.017	-0.008	-0.007
Poland	-0.012	-0.008	-0.006	-0.007
Western countries	-0.007	-0.005	0.007	0.001
Southern Europe	0.003	0.004	0.015	0.008
Chile	-0.011	-0.008	0.002	0.002
Latin America	-0.015	-0.010	-0.001	0.000
Horn of Africa	-0.018	-0.009	-0.010	-0.003
Other Africa	-0.008	-0.004	-0.010	-0.010
MENA	-0.022	-0.012	-0.009	-0.010
Iran	-0.039	-0.028	-0.002	-0.002
Turkey	-0.019	-0.022	-0.002	-0.003
East Asia	-0.007	-0.007	-0.002	-0.005
South Asia	-0.019	-0.018	-0.007	0.002
Other Asia	-0.031	-0.032	-0.001	-0.001

Table 6 B: Part of the log wage differential between those with Swedish and immigrant background attributable to difference in education-occupation mismatch. Women

	Overeducation		**Undereducation**	
	Weighted by parameter for natives	Weighted by parameter for the group	Weighted by parameter for natives	Weighted by parameter for the group
Second generation:				
Europe	0.000	0.000	-0.001	-0.001
Former Yugoslavia	-0.011	-0.008	-0.002	-0.001
Southern Europe	-0.006	-0.013	-0.001	-0.001
Turkey	-0.015	-0.006	-0.003	0.001
Outside of Europe	-0.019	-0.010	-0.005	-0.003
Childhood immigrants:				
Finland	0.006	0.007	0.000	0.000
Denmark. Norway or Iceland	0.006	0.006	0.005	-0.001
Former Yugoslavia	-0.002	-0.001	-0.002	-0.001
E. Europe 3 and the Baltic states	-0.007	-0.004	-0.006	-0.013
E. Europe 2	-0.024	-0.020	-0.004	-0.003
Poland	-0.008	-0.005	-0.003	-0.003
Western countries	-0.006	-0.009	0.004	0.009
Southern Europe	0.008	0.012	0.002	0.002
Chile	-0.003	-0.001	0.000	0.000
Latin America	-0.006	-0.003	-0.002	-0.003
Horn of Africa	-0.003	-0.001	-0.005	-0.004
Other Africa	-0.005	-0.003	-0.002	-0.002
MENA	-0.017	-0.022	-0.003	-0.002
Iran	-0.017	-0.012	-0.004	-0.008
Turkey	0.003	0.000	0.006	0.005
East Asia	-0.023	-0.033	-0.003	-0.001
South Asia	-0.019	-0.025	-0.006	-0.008
Other Asia	-0.020	-0.014	-0.005	-0.004

As Table 6 A and Table 6 B shows, differences in frequency of overeducation does not have a very large impact on the native-immigrant wage gap for the childhood immigrants. Nevertheless, when the difference in overeducation is weighted by the origin-specific penalties for second generation Swedes with Yugoslav or non-European background, as well as for childhood immigrants from Eastern Europe 2 (mostly ex-USSR), the Middle East (MENA, Iran and Turkey), and Asia, it amounts to a loss in the order of 2-3 percentage points. Undereducation plays an almost negligible role. The

latter result differs from those reported for the US (Chiswick and Miller, 2008), but this is not surprising. Chiswick and Miller attribute the positive impact of undereducation on the wages of immigrants to positive selection but in the case of our sample, the decision to migrate is more likely to have been taken the parents than by the childhood immigrants themselves. Furthermore, most of the parents of the non-European childhood immigrants came as refugees, not as labour migrants.

A comparison of the size of effects in Table 6 with those in the difference in returns to education leads us to the conclusion that the latter are more important than either over- or undereducation for our sample. Remember, however, that these are workers who were born in Sweden or immigrated as children. If the sample had been of immigrants who arrived as adults, the result might well have been different.

9 A comparison with education, overeducation and wages of adult immigrants

Although, our focus is on childhood immigrants – those who settled in Sweden before age 16 – it is instructive to compare with ”adult” immigrants who were above this age when they immigrated. Thus, the terms “childhood” and “adult” refer to age at immigration. Although the “adult” immigrants in the sample are *not* the parents of the “childhood immigrants”, the comparison gives us an indication of whether integration on the labour market for immigrants is easier for those who have grown up in Sweden. Descriptive statistics for the “adult immigrants” are given in Appendix C.

In a considerable number of groups, childhood immigrants have somewhat shorter average schooling than the adult immigrants in the 25-49 age range. Among men, only childhood immigrants from Chile, Horn of Africa, MENA, Turkey and South Asia have more average years of education then those who immigrated as adults. Among women, the picture is somewhat different – female childhood immigrants from non-European-/non-Western countries have longer average education than adult immigrants but those from European/Western countries (except Poland and former Yugoslavia) have shorter.

Figure 3 A: The odds-ratios of being overeducated for male childhood immigrants relative to adult immigrants and of adult immigrants relative to natives

Regression coefficient p-value 0.009

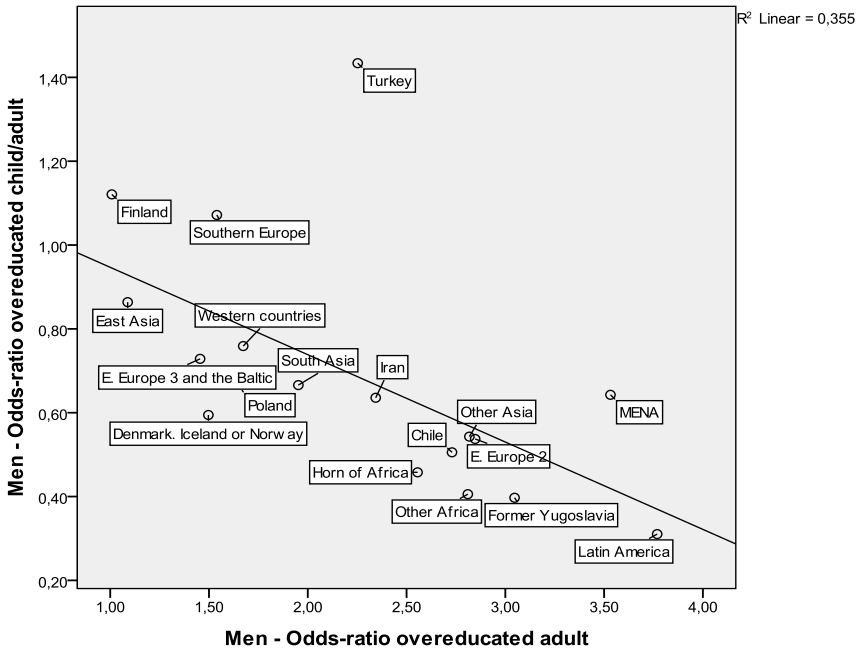
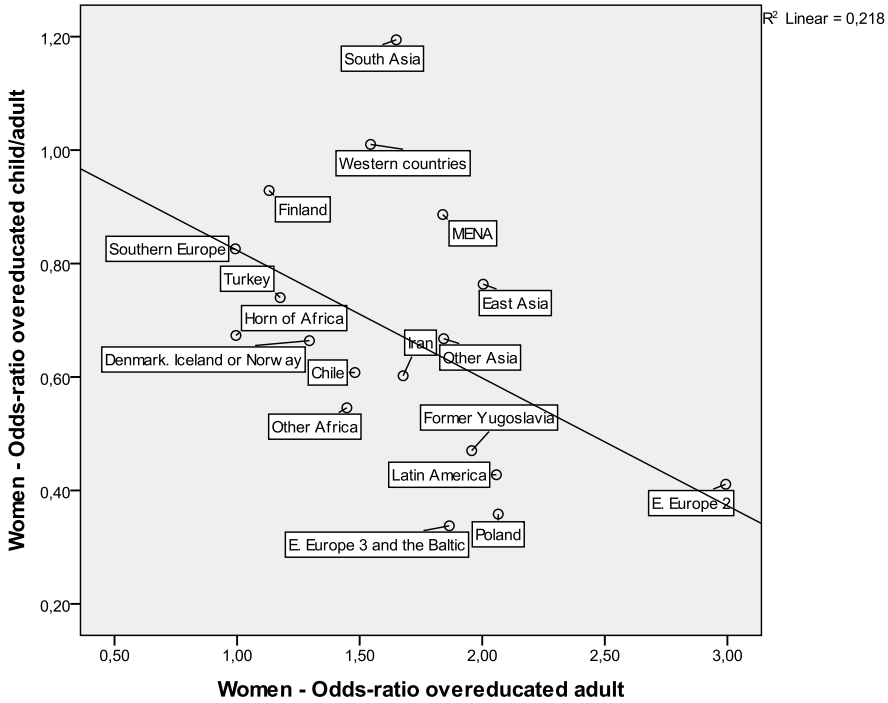


Figure 3 B: The odds-ratios of being overeducated for female childhood immigrants relative to adult immigrants and of adult immigrants relative to natives

Regression coefficient p-value 0.051



In a few groups of male, adult immigrants the frequency of overeducation is approximately equal to that of native men, but among immigrants from most countries, in particular the non-European, it is substantially larger. Among immigrant women the frequency of overeducation is lower than among the men, and the difference relative to native women is less pronounced. When the probability of being overeducated is estimated with the same multinomial logistic regression model as for childhood immigrants,[32] practically all groups of adult immigrants run a larger risk of overeducation than native Swedes.[33] For nearly all adult immigrant men born outside Europe (except South and East Asia) and from former Yugoslavia and Eastern Europe 2, the odds are at least twice as high as for men with Swedish-born parents. The differentiation is closer to a ”visible difference” or “geographical distance”- pattern than to a “labour immigration versus refugees”-pattern. For women, the odds for most “white” immigrants are 1-2 times those of natives while for those from Latin America, the Middle East and Africa they are 2-4 times as high but so are the odds for those from the former USSR and former Yugoslavia.[34]

Somewhat contrary to expectations, in quite a lot of cases the “raw” percentages that are overeducated are larger for the childhood immigrants than for the adult. The picture is altered, however, when odds ratios are estimated with controls for individual characteristics. This can be seen from Figure 3 A and Figure 3 B, where the odds ratio for adult immigrants relative to native Swedes is measured along the horizontal axis while the vertical axis indicates the odds ratio for children of immigrants relative to adult immigrants of the same origin. Values below one on the vertical axis indicate that the children of immigrants from this country run a smaller risk of being overeducated than those who immigrated as adults. This is true for the majority of groups. In these cases, growing up in Sweden and having a Swedish education makes a difference.

Note, however, that the three cases where male childhood immigrants are more likely to be overeducated than the adult male immigrants, all refer to labour transmitter countries: Finland, Turkey and Southern Europe.[35] The odds for being overeducated are large for adult immigrants from Turkey, but not at all as large as the exceptionally high

[32] See footnote to Table 4 for the specification of the model.
[33] For men born in Finland or East Asia and women born in the Horn of Africa or Southern Europe the odds-ratio is approximately equal to one.
[34] The odds ratios for child immigrants were reported in Table 4 and those for adult immigrants can be read off against the horizontal axis of figure 3.
[35] For those from East Asia the difference is negligible.

odds for Turkish childhood immigrants. Female childhood immigrants are more likely to be overeducated than adult, female immigrants if the country of origin is in South Asia but the ratio child/adult is only slightly below one also for those from MENA, Southern Europe, Western countries and Finland. Thus, for these groups, a wholly or partly Swedish education does not seem to decrease the risk of overeducation

The graphs show that there is a tendency for the adjusted probabilities of overeducation to regress towards the mean in the sense that groups that have the highest risks among the adult immigrants also have the largest differences between childhood immigrants and adult immigrants. We regressed the odds ratio for being overeducated of childhood immigrants relative to adult against the odds ratio for adult immigrants being overeducated relative to native Swedes (the regression lines are shown in Figure 3 A and Figure 3 B) and the coefficients were negative and significant at the 5 per cent level for both genders, confirming the visual impression. Although the slope of the curves is unmistakable, the countries for which the odds were larger for childhood immigrants than for adult immigrants lie well above the regression line, as is to be expected. Most groups of non-European origin are below it, indicating more than average convergence towards the mean. Adult immigrants from these countries had much higher risks of being overeducated than child immigrants.

Average wages are higher among childhood immigrants than adult immigrants of the same gender and origin, To see whether this was also the case when individual and job characteristics were controlled for, we estimated Model 1 (see section 5, above and Table 3) for men and women who immigrated at age 16 or older. All nationalities have a negative adjusted wage differential relative to native workers. The size of the wage differential is smaller for immigrants from European[36] and Western countries than for those from Africa, Asia, Latin America and the Middle East. The largest adjusted wage differential is that for adult, male Turkish immigrants, 24 per cent relative to male, native workers.

Figure 4 A and Figure 4 B are analogous to Figure 3 A and Figure 3 B. They plot the average adjusted wage ratio of childhood immigrants relative to adult immigrants (on the vertical axis) against the ratio of adult immigrants' adjusted wages relative to those of natives (on the horizontal axis).

[36] Note, however, the large wage disadvantage for those from the former USSR (Eastern Europe 2).

Figure 4 A: The relation between the adjusted wage ratio for male childhood immigrants and male adult immigrants

Regression coefficient p-value 0.000

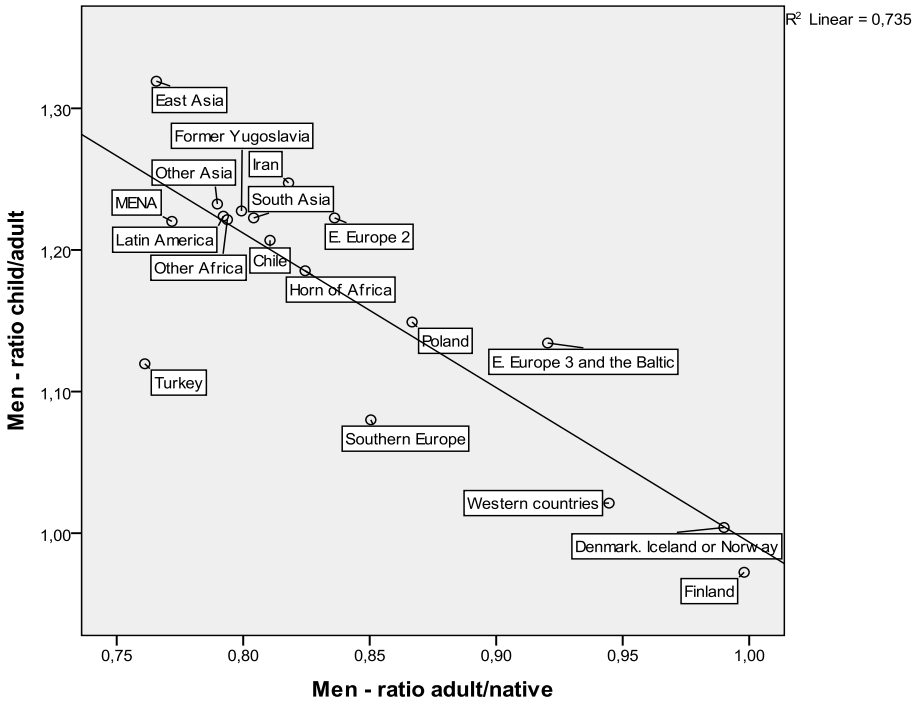
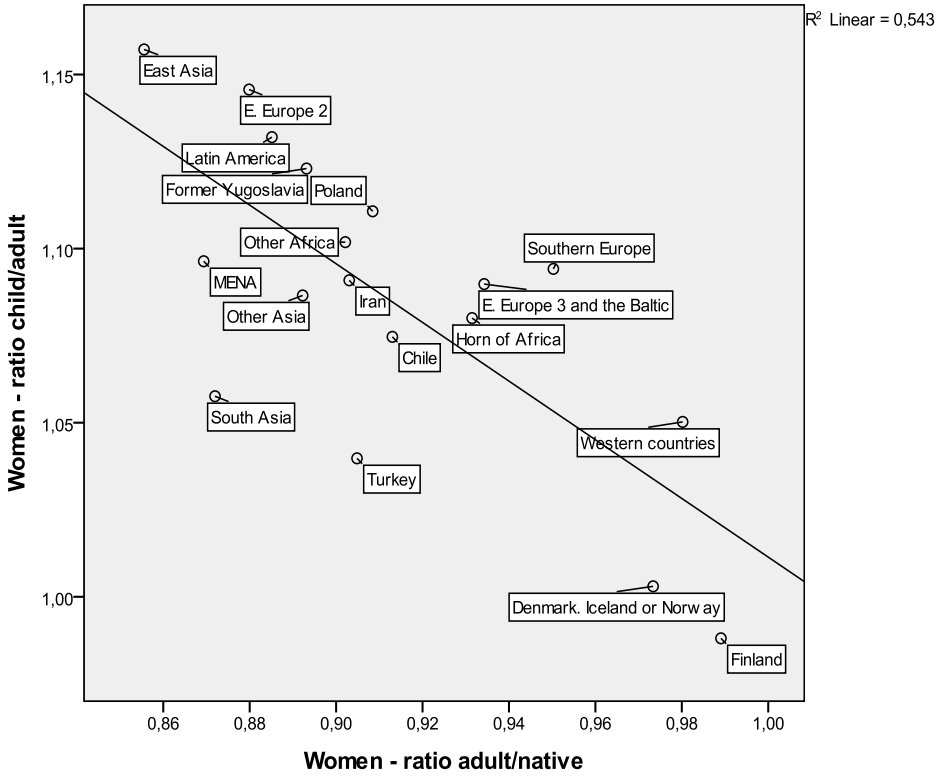


Figure 4 B: The relation between the adjusted wage ratio for female childhood immigrants and female adult immigrants.

Regression coefficient p-value 0.000



As can be seen, there is a negative relation (significant at the 1 % level). This means that the larger the wage disadvantage of adult immigrants from a given country is relative to natives, the greater is the difference between adult and childhood immigrants. Most major labour migration countries, Turkey, Southern Europe, Finland and Scandinavia are below the regression line. (Women from Southern Europe are an exception to this, however.) This indicates that the difference between adult and childhood immigrants is smaller than could be expected. The pattern is similar for men and women but the wage differential relative to natives is in general smaller for women than men.

The catch-up we find for most groups seems to differ from the results of Rooth and Ekberg (2003) and Hammarstedt and Palme (2006) but there are differences in the sample – we compare childhood and adult immigrants in the same year while they compare first and second generation Swedes at different points in time. Further, two of the four areas of origin for which they show that Swedish-born children of immigrants have lower adjusted earnings than the parent generation – Greece, in their coding, Southern Europe in ours, and Turkey – are among the few where we find something similar.

10 Discussion and conclusions

In conclusion, we find that the majority of groups of children of immigrants – childhood immigrants as well as second generation Swedes - have lower adjusted wages than workers with parents born in Sweden. These wage differentials according to origin are statistically significant even though our estimates are, if anything, underestimates, of what would be found in the absence of selection into employment.

In the great majority of cases, the groups (both male and female) with the largest *unadjusted* wage gaps relative to natives are from countries geographically far from Sweden, from the Global South. When it comes to the *adjusted* wage differentials from Model 1, the picture is much more complex. For male childhood immigrants from nearly all non- European countries the adjusted wage disadvantages relative to natives are considerably smaller than the "raw" differences in average wage. In other words, our model included variables that could account for a substantial part of the differentials. This is not the case for two of the major labour transmitters of the 1960s and 1970s: The sons of Turkish immigrants and male childhood immigrants from

Southern Europe have the largest negative adjusted wage intercepts. Yet, the Swedish born children of Southern European immigrants and the children of Finnish and Yugoslav immigrants have a much smaller wage disadvantage even though their education levels are similar.

Among women, the within-gender wage differentials relative to natives, adjusted as well as unadjusted, are generally smaller than for men with the same background. There are several possible explanations: First, as le Grand and Szulkin (2002) note, immigrant female workers face the disadvantage of being women, in addition to being foreign born, and that disadvantage is shared by the native women with whom we compare them. Second, the lower participation rates may imply a positive selection effect for immigrant women workers. Third, women are more likely to be employed in the public sector where wages are more compressed than in the private sector. The largest negative intercepts we find for women are those for South Asia, Turkey, and MENA.

Returns to education are different for individuals of different origin. Many groups with immigrant parents are disadvantaged by having lower returns to education than workers with Swedish-born parents. Among men, in Models 3 and 4, we find the lowest returns to education for childhood immigrants from Latin America, the Horn of Africa, MENA, Iran and "Other Asia", as well as for second generation Swedes with a Southern European and non-European background. Some of these groups have long average education and some have relatively short. In the female wage equations, Swedish born daughters of Turkish immigrants and childhood immigrants from Chile, the Horn of Africa, Iran, and East Asia have the lowest returns to education.

The returns to education estimated by Model 2 imply an average wage differential ranging from 12 to 14 per cent between a worker with upper secondary education and a worker with three years of post-secondary education, if they are male childhood immigrants from MENA, “Other Asia”, the Horn of Africa, Latin America or Iran. The corresponding difference for men with Swedish born parents is 21 per cent. Women who immigrated from the Horn Africa as children and acquired three years of post-secondary education have 8 per cent higher wages than those who have only upper secondary. For women with Swedish born parents the difference is 16 per cent.

Incorporating interactions between education and origin shifts the parameters for origin considerably, in some cases from negative to positive. In models with country-

specific returns to education, country intercepts and education premia have to be interpreted jointly. What the shifts indicate is that the differences in education premia are an important mechanism of wage disadvantage for childhood immigrants. However, for some highly educated groups - mainly Eastern European –returns to education are above those for native Swedes.

The raw average wages indicate that the small differences in pay, between workers with different levels of schooling within some groups, is due to low wages among highly educated childhood immigrants, even though the education was acquired in Sweden. All the groups which have very low wages for university educated workers are groups from the Global South, although the converse is not always true. It is rarely possible to prove the existence of discrimination by statistical methods, but these results are an indication of it. It is plausible that, in a country like Sweden, where the lower part of the wage distribution is more compressed than in many other countries, there is less room for discrimination at the lower end of the scale.

We find that childhood immigrants from the large majority of transmitter countries are more often overeducated than natives, but that for some groups, particularly for women, the difference ceases to be statistically significant when odds ratios are estimated with controls for a number of labour market characteristics. Both the odds-ratios and the wage coefficients for overeducation vary considerably by country of origin and gender, and so do returns to education and wage differentials relative to native Swedes. The different odds-ratios and parameters do not have an obvious geographical pattern. Countries in the same region, such as Iran and the MENA countries, may differ more than some which are very distant from each other, geographically and culturally. Our results certainly demonstrate the importance of being country- and gender specific when speaking of "immigrants" or of "non-European immigrants". The largest negative coefficients for overeducation in the wage equations tend to be found for male childhood immigrants from the main labour migration transmitter countries.

The size of the coefficients for overeducation in the wage equations indicates that our measure of it does capture something which is of importance in the wage setting process. The complicated pattern of differences between groups of different origin indicates a need for detailed research on what exactly this "something" is - the

individual characteristics of those who are overeducated and the jobs they have. Such research should use both register and survey data and ideally combine quantitative and qualitative methods.

The probability of being over-educated is larger for most groups of children of non-Western immigrants than for native Swedes even though we control for a rich set of characteristics, including field of education. This is rather consistently so for men, while the picture is more diverse among women. A possible reason why certain immigrant groups have smaller penalties for overeducation than natives could be that immigrants have a harder time finding a job at the level they are educated for, but that those who take a job at a lower educational level are less likely to be negatively selected than over-educated native workers. Yet, with such variation in results between groups of different origin, conclusions should be drawn with caution.

That there is a statistical relation between over-education and wages does not necessarily mean that there is a direct causal relation – that individuals are overeducated for their jobs could be taken as an indication of lower underlying ability or motivation (Leuven and Oosterbeek, 2011). It is harder to apply this interpretation when there is a systematic difference in the probability of being overeducated between collectivities, gendered or ethnic. The childhood immigrants that are the subject of this study received their highest educational degree in Sweden and the great majority of them should have a good command of the language. We, therefore, find it difficult to believe that the elevated risk of overeducation for childhood immigrants, and childhood immigrants of some backgrounds more than others, would only, or even primarily, reflect differences in ability or motivation. It seems more plausible, and more in line with a search theoretic perspective, that when there is involuntary unemployment and discrimination in hiring (Carlsson and Rooth, 2008), workers of immigrant origins would have to accept a job at a lower level of qualification than what they possess, more often than those with native Swedish background.

Introduction of years of over- and undereducation interacted with origin has a smaller impact on wage differentials between the groups, than the differential returns to education had. This is in line with the "Oaxaca-calculations" in Table 7 which indicate that for workers of immigrant background who were born in Sweden or immigrated as children, overeducation is not generally a major mechanism of wage disadvantage, even

though discrimination might be an important reason why the probability of overeducation is larger for them than for those with Swedish-born parents.

Overall, our results for childhood immigrants tend to support the finding from other studies of immigrants in Sweden, generally: That the employment gap is the number one problem, but that unexplained wage differentials are nevertheless considerable for many groups. In terms of the probability of being in the core labour force, geographical distance and "visibility of difference" fit the picture better than they do when it comes to the wages of those who are employed. (For an example, compare the different labour market outcomes for children of immigrants from Iran, MENA and Turkey or those for immigrants from Chile with those from other Latin American countries.)

We find that the children of labour immigrants from Finland, Turkey, Southern Europe and Yugoslavia are quite disadvantaged in terms of lower education, low probability of being in the core labour force (with the exception of those from Finland), and high probability of being overeducated (at least for males). The sons of immigrants from Turkey and male childhood immigrants from Southern Europe also experience a large adjusted wage disadvantage relative to workers born in Sweden. What is lacking in the data that we have access to, is information on parents' education and social class. If we had been able to control for parental characteristics or compare this group only with workers whose parents were born in Sweden but with the same socio-economic position, we believe that the difference would have been smaller for the children of the labour migrants. For the children of refugees this is not obvious – it could even increase some of the ethnic differentials. This is a topic for further research.

A lesson for the present is that although employment is of prime importance for integration and equality, it is not sufficient. The labour immigrants, who have been essential for Swedish engineering industries, for care and home help for the elderly and other services in the post-war period, got jobs but that does not necessarily mean that they and their children had the same opportunities as native Swedes.

The diversity of results means that any integration and anti-discrimination policies must take into account complex interactions between gender, geographic origin, and education of the individual but also of the type and timing of immigration. Broad generalisations in terms of "labour migrants versus refugees" or of "Northern/Western" versus "non-European" are in some respects informative, in others misleading.

This is true also for people who have lived in Sweden since they were children and have acquired their highest level of education in Sweden. Their disadvantage should not be due to lack of Sweden-specific human capital, to any major extent, but they may lack social capital in the sense of the informal contacts that are important for labour market entrants and they may be subject to discrimination. Lack of knowledge about how to search, and of a network that can help in finding jobs in general, and well-paid jobs in particular, are plausible factors behind disadvantage for youth whose parents are immigrants, factors that are not correlated with productivity at work. Both this and discrimination would imply an injustice and a loss to the individuals concerned as well as an inefficient use of their potential in Swedish society.

Appendix

Appendix A. Description of background groups

Background	Men - unweighted	Women - unweighted	Men _weighted	Women - weighted
Swedish background- at least one Swedish born parent	491136	604943	913452	836103
Second generation				
Other Europe	11179	13730	21317	19201
Former Yugoslavia - Yugoslavia, Croatia, Macedonia, Slovenia and Bosnia-Herzegovina	1988	1889	3885	2535
Southern Europe - Greece, Italy, Malta, Monaco, Portugal, San Marino, Spain and Vatican City	586	538	1011	889
Turkey	434	539	765	769
Non-European countries except Canada, USA, Australia, Fiji, Kiribati, Micronesia, Nauru, New Zealand, Palau, Papua New Guinea, Solomon Iceland, Tonga, Western Samoa and Vanuatu	389	421	614	637
Childhood immigrants				
Finland	5331	7359	9734	10106
Scandinavia	1308	1691	2488	2644
Former Yugoslavia - Yugoslavia, Croatia, Macedonia, Slovenia and Bosnia-Herzegovina	1616	1874	2781	2473
Eastern Europe 3 and the Baltic states- Slovakia, the Czech Republic, Czechoslovakia, Hungary, Estonia, Latvia and Lithuania	315	344	459	669
Eastern Europe 2 - Albania, Armenia, Azerbaijan, Bulgaria, Kazakhstan, Kyrgyzstan, Georgia, Moldova, Romania, Russia, Soviet Union, Tajikistan, Turkmenistan, Ukraine and Uzbekistan	319	322	502	404
Poland	706	832	1281	1175
Western countries - Ireland, Britain, German Dem Rep (DDR), Germany, Andorra, Belgium, France Lichtenstein, Luxembourg, Netherlands, Switzerland, Austria, Canada, USA, Australia, Fiji, Kiribati, Micronesia, Nauru, New Zealand, Palau, Papua New Guinea, Solomon Iceland, Tonga, Western Samoa and Vanuatu	1322	1494	2501	2605
Southern Europe - Greece, Italy, Malta, Monaco, Portugal, San Marino, Spain and Vatican City	432	507	659	738
Chile	1022	1202	1591	1577
Latin America - Antigua and Bermuda, Bahamas, Barbados, Belize, Costa Rica, Cuba, Dominica, Dominican Rep,,, El Salvador, Grenada, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, St Lucia, St Vincent St Kitts & Nevis & Anguilla, Trinidad and Tobago, Argentina, Bolivia, Brazil, Colombia, Ecuador, Paraguay, Peru, Guyana, Suriname, Uruguay and Venezuela,	886	971	1398	1280
Horn of Africa and Sudan - Djibouti, Eritrea, Ethiopia, Somalia and Sudan,	368	402	474	472
Other Africa - Angola Arab Republic Of Egypt Benin Botswana Burkina Faso Burundi Central Africa, Rep Comoros Equatorial Guinea Ivory Coast Gabon Gambia Ghana Guinea Guinea-Bissau Cameroon Cape Verde Congo Kenya Lesotho Liberia Madagascar Malawi Mali Mauritania Mauritius Mozambique Namibia Niger Nigeria Rwanda Sao Tome and Principe Senegal Seychelles Sierra Leone South Africa Swaziland Tanzania Chad Togo Uganda Zaire Zambia Zanzibar Zimbabwe	274	321	371	387
MENA - Algeria Bahrain Cyprus Egypt French Morocco, United Arab Emirates Gaza Area Yemen Israel Jordan Kuwait Lebanon Libya Morocco Palestine Qatar Saudi Arabia Syria Tunisia, Southern Yemen and Iraq	803	867	1423	1326
Iran	718	721	1158	951
Turkey	624	897	1057	1271
East Asia - Hong Kong, Japan, ,China, China (Taiwan) South Korea, Dem North Korea,	553	1595	1107	2573
South East Asia - Philippines Indonesia Laos Malay Federation Malaysia Singapore Thailand Vietnam, Rep Vietnam	797	762	1404	1341
Other Asia - Afghanistan Bangladesh Bhutan Brunei India Kampuchea Maldives Mongolia Nepal Oman Pakistan Sikkim Sri Lanka	766	1459	1371	2133

Appendix B. Overeducated (OED) by ISCO 1-digit occupation*

(%) All employees age 25-49

ISCO-Group	1	2	3	4	5	6	7	8	9	Total	Men	Women
OED	2.1	9.0	23.6	54.4	50.6	28.9	10.7	56.4	72.3	31.0	31.2	34.5

*Group 1 - Legislators, senior officials and managers
Group 2 – Professionals
Group 3 - Technicians and associate professionals
Group 4 – Clerks
Group 5 – Service workers and shop sales workers
Group 6 – Skilled agricultural and fishery workers
Group 7 – Craft and related trades workers
Group 8 – Plant and machine operators and assemblers
Group 9 - Elementary occupations

Appendix C. The SUN2000. SEI and SSYK classifications

The SUN2000 classifications and the years of schooling we have imputed from it (YSCH) are as follows:

SUN-code	Level	YSCH
64	Doctoral (PhD)	21
62	Licentiate	19
60	Other advanced degree	18
55	Post-secondary 5 years or more	17
54	Post-secondary 4 years	16
53	Post-secondary 3 years	15
52	Post-secondary 2 years	14
41	Post-secondary less than years	13
33	Upper secondary 3 years	12
32	Upper secondary 2 years	11
31	Upper secondary less than 2 years	10
20	Compulsory school 9 (10) years	9
10	Compulsory school less than 9 years	8
00	Pre-school	

The Socio-Economic classification. SEI. distinguishes nine categories of employees:

Category	**Required education after compulsory**
Blue collar occupations	
11 Unskilled workers in manufacturing.	Less than two years
12 Unskilled workers in services	Less than two years
21 Skilled workers in manufacturing	At least two years
22 Skilled workers in services.	At least two years
White collar occupations	
33 Lower grade white collar I	Less than two years
36 Lower grade white collar II	At least two years. but not three
46 Middle level white collar	Three years but not six
56 Higher level white collar	At least six years

57 Managerial positions No level defined
(see Statistics Sweden MIS 1982:4
http://www.scb.se/Grupp/Hitta_statistik/Forsta_Statistik/Klassifikationer/_Dokument/SEI-MIS.pdf)

We have ascribed intervals for adequate education which was afterwards modified for particular occupations:

SEI	
11-12	8-10
21-22	11-14
33-36	11
46	12-14
56	15-21
57	11-21

As can be seen we have deviated from the literal SEI-definitions by ascribing a maximum adequate education for skilled blue-collar occupations (makes almost no difference in practise) and a minimum required level for managerial positions.

The main modifications made were made for occupations in SSYK-groups 2 and 3

a) when a clearly defined level of education is required for the occupation (medical nurse, physician, civil engineer, psychologist etc.)
b) when this level was changed by the reform of higher education in 1993 (HSF:1993) the new level was set as adequate for those who graduated late enough to have done it according to the new system. For example, for a pre-school teacher or a general medical nurse graduating in 1995 or earlier adequate education was 14 years. For later cohorts it could be 15-21 years. The minimum post-secondary education had been raised from 2 to 3 years and it became possible to continue to an advanced degree.

Occupation-by-occupation detail is available from the authors on request.

The IFAU-data on occupation which we have used stems originally from the Wage Data Base which classifies occupations according to SSYK 96. The SEI classification is of occupations coded according to another system, NYK (Nordisk Yrkesklassificering). SSYK and NYK codes cannot be fully translated into each other. We are therefore very grateful to have been allowed to use a comparison made by Statistics Sweden.[37] One year wave of the Swedish Labour Force Survey (AKU) and one of the Survey on Living Conditions (ULF) were coded by both classifications and each SSYK-occupation was ascribed the SEI-code most frequently held by those in that occupation. In 266 cases the SEI-coding is the same in both cases and in 35 the occupation only occurs in either

[37] Warm thanks to Leif Haldorson for this and for very helpful answers to our questions about the classifications. The responsibility for how we use the SSYK-SEI comparison is, of course, our own.

AKU or ULF. 54 occupations are assigned different SEI-codes from ULF- and AKU-data and in these cases we have ascribed the qualification level ascribed to these occupations by SSYK after a case-by-case check to avoid anomalies. Details are available from the authors.

Appendix D. Descriptive statistics for immigrants who arrived as adults.

Average monthly full-time wage (WAGE), average years of schooling (YSCH) and percentage over- and undereducated (OED and UED) of workers who immigrated at age 16 or older

	Men				**Women**			
Country of birth	WAGE*	YSCH	OED	UED	WAGE*	YSCH	OED	UED
Finland	28521	12.1	20%	18%	23917	13	25%	15%
Denmark. Norway or Iceland		13.1	30%	16%	22734	12.8	25%	18%
Former Yugoslavia	20772	11.9	46%	9%	19080	11.7	36%	6%
E. Europe 3 and the Baltic states	27604	14.1	27%	12%	22449	13.9	39%	7%
E. Europe 2	24501	13.8	39%	12%	21833	14.3	43%	8%
Poland	25474	12.9	29%	14%	21527	13	34%	10%
Western countries	30327	14.2	30%	14%	25103	14.5	30%	14%
Southern Europe	24884	12.9	25%	23%	23768	13.7	23%	15%
Chile	20276	11.4	39%	12%	19402	11.6	26%	13%
Latin America	22349	13.1	43%	9%	20146	12.7	34%	10%
Horn of Africa	20559	11.8	36%	9%	19880	11.4	21%	4%
Other Africa	21766	12.6	40%	8%	19387	12	28%	5%
MENA	21202	12.3	39%	15%	18703	12.1	29%	14%
Iran	24260	13.2	33%	13%	21528	13.2	27%	11%
Turkey	19568	10.7	30%	21%	18277	10.8	22%	20%
East Asia	27966	14.5	14%	18%	21775	13.6	31%	22%
South Asia	20054	10.8	25%	25%	17633	10.7	29%	9%
Other Asia	22279	12.9	39%	8%	19277	12	33%	10%

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