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Ethnic Labor Market Gaps in Sweden*

Lena Nekby, Roger Vilhelmsson and Gülay Özcan

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Do Domestic Educations Even Out the Playing Field? Ethnic Labor Market Gaps in Sweden*

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Abstract

The importance of investing in host country-specific human capital such as domestic language proficiency and domestic education is often cited as a determining factor for the labor market success of immigrants. This suggests that entirely domestic educations should even out the playing field providing equal labor market opportunities for natives and immigrants with similar (domestic) educations. This study follows a cohort of students from Swedish compulsory school graduation in 1988 until 2002 in order to document ethnic differences in education, including grades and field of education, and subsequent labor market outcomes. Results indicate both initial differences in youth labor market status and long term differences in employment rates, most notably for those with Non-European backgrounds. Differences in level or field of domestic education cannot explain persistent employment gaps. However, employment gaps are driven by differences among those with secondary school only. No employment or income gaps are found for the university educated.

JEL Classification: J15, J71, I21, Z13

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* Lena Nekby: Department of Economics, Stockholm University and the Stockholm University Linnaeus Center for Integrations Studies (SULCIS). Roger Vilhelmsson: Swedish Agency for Government Employers (SAGE). Gülay Özcan: Department of Economics, Stockholm University and SULCIS. Corresponding author: Gülay Özcan; gulay.ozcan@ne.su.se

1. Introduction

The importance of local, or country-specific, human capital for the labor market integration of immigrants has been widely discussed in the integration literature.¹ Some forms of human capital are not transferable between countries implying that migration is associated with a loss of country-specific human capital. The importance of investing in host country-specific human capital such as domestic language proficiency and domestic education is therefore often cited as a determining factor for the labor market success of immigrants.² A closely related strand of literature looks at the importance of age at immigration for educational and labor market outcomes.³ The underlying premise in these studies is that entirely domestic educations should even out the playing field providing equal labor market opportunities for natives and immigrants with similar (domestic) educations. This study aims to analyze this question, examining to what degree varying investment in domestic human capital explains labor market gaps between natives and immigrants (first and second generation) in Sweden. Most studies in this field focus on educational attainment; few have documented ethnic labor market gaps between natives and immigrants with observationally equivalent educations, including information on grades, as well as detailed information on level and field of (domestic) education. This is true despite the huge emphasis placed on local human capital as an explanation for ethnic employment disparities.

A number of studies on the Swedish labor market find significant differences between immigrants and natives in terms of labor market outcomes. Immigrants have lower income and wage levels, lower employment levels, and higher unemployment levels than natives.⁴ Significant differences to natives have been found even for those born in Sweden with immigrant backgrounds (one or both parents born abroad) raising the question of whether investment in local human capital significantly differs between these groups or if there are other mechanisms behind labor market disparities for those with largely or entirely domestic educations.⁵ In this study, we follow a cohort of students from Swedish compulsory school graduation in 1988 until 2002 in order to document ethnic differences in

¹ See for example the overview by Borjas (1999) in the Handbook of Labor Economics and the references therein.

² Chiswick, (1978); Rivera-Batiz, (1990); Dustman & van Soest, (1999); Chiswick, (1991), Chiswick & Miller, (1995); Shields & Price, (2000); Dustmann & Fabbri, (2003).

³ Chiswick (1978), Chiswick & Bebburman (2004), Cortes (2006), Dustman & Theodoropoulos (2006), Gonzalez (2001), Schaafsma & Sweetman (2001), Van Ours & Veenman (2006), Zimmerman (1999).

⁴ For studies on income or wage differences between immigrants and natives in Sweden, see Aguilar & Gustafsson (1994), Edin & Åslund (2001), Edin *et al.* (2000), Edin *et al.* (2004), Heshmati & Maasoumi (2000), le Grand & Szulkin (2000), Rashid (2004), Rosholm *et al.* (2000) och Österberg (2000). These studies find that income differences between groups are driven by employment differences. For studies on employment disparities, see Arai *et al.*, (2000a, 2000b), Arai & Vilhelmsson (2004), Ekberg (1991), Lundborg (2000), Nekby (2003), Vilhelmsson (2002) och Wadensjö (1997).

⁵ For studies on natives with immigrant backgrounds in Sweden, see Behtoui (2006), Ekberg & Rooth (2004), Hammarstedt & Palme (2004), Vilhelmsson (2002) och Österberg (2000).

education and subsequent labor market outcomes. The obvious advantage of following one cohort from school into the labor market is that students throughout face similar macroeconomic conditions and should therefore face similar educational and labor market opportunities. We therefore avoid problems associated with for example varying immigrant composition over time or varying economic cycles which may permanently scar those entering the labor market during economic recessions. Our results are based on one cohort of students with domestic educations and can not therefore be generalized to the immigrant population at large. Instead, by looking at a positive selection of students with long duration of residence, early age at immigration (if born abroad) and domestic educations, we provide a lower bound for observed ethnic labor market gaps.⁶

The main questions of this paper are the following: For which groups of ethnic minority youths are disparities found in early labor market outcomes? How persistent are employment gaps over time? To what degree do employment differences reflect varying investment in domestic education? More specifically, to what degree are initial labor market outcomes affected by differences in Swedish language proficiency and do differences in level and field of domestic education explain ethnic employment gaps over time?

Ethnic labor market disparities may exist despite domestic educations. Immigrants with long duration of residence may for example vary in terms of whether immigration occurred before or after primary school start.⁷ Among second generation immigrants, investment in education may vary both in terms of the effort placed on learning and success in school (both measured by grades). Level and field of education may also differ from students with Swedish backgrounds. Parent's educational level and socio-economic status have also been found to influence both the motivation to invest in education as well as choices concerning type of further education. Theories of inter-generational mobility often explain a disadvantageous labor market situation among children in terms of weak socioeconomic status or low levels of parental education (Björklund *et al.*, 2004; Black *et al.*, 2005; Borjas, 1992, 1993; Card *et al.*, 1998; Hammarstedt & Palme, 2006; Gang & Zimmerman, 1999).

⁶ The majority of immigration to Sweden during the post WW2 period has been and continues to be from other Nordic countries, primarily from Finland. Formally, a common Nordic labor market was established in 1954 but migration legislation was, until the late 1960s, non-restrictive and aimed at attracting foreign labor to an expanding export industry. In 1954 Sweden signed the Geneva Convention opening for refugee migration. Immigration before the mid 1970's consisted primarily of labor market immigration from Nordic and European countries. After the mid 1970's, refugee immigration from primarily Non-European countries increased greatly and today accounts, together with immigration due to family re-unification, for approximately 50 percent of the total immigration to Sweden.

⁷Böhlmark (2006), using sibling data on Sweden, finds that the critical age at arrival is at age nine, above which there is a strong negative impact on school performance.

Ethnic capital and ethnic enclaves may influence domestic human capital formation. Educational and labor market outcomes may be influenced by the quality of the ethnic environment in which a child is raised, i.e., by the average skills and labor market experience of the ethnic group to which one belongs (Borjas, 1992; Bertrand *et al.*, 2000; León, 2004). Residential segregation may also have a direct negative influence on learning or the probability to invest in higher education.⁸ Finally, ethnic enclaves may limit contacts with the majority population hindering some forms of employment while facilitating employment within local ethnic networks (Borjas, 1995; Bertrand *et al.*, 2000).⁹

Results indicate both initial differences in youth labor market status and long term differences in employment for especially those with Non-European backgrounds. In 1995, Non-Europeans are significantly more likely to be in labor market programs, unemployed, in school and out of the labor force rather than being employed in comparison to those with Swedish backgrounds. These estimations control for grades in Swedish, type of secondary school, immigration after school start, socio-economic background and a number of other demographic characteristics. Employment differences estimated on a sub-sample with entirely domestic educations do not disappear over time for those with Non-European backgrounds. Although some differences are found in level and field of education, inclusion of a detailed control for education do not eliminate ethnic employment gaps for Non-Europeans. Results are driven by employment differences among those with maximum secondary education. No ethnic employment gap is found for the university educated.

The paper proceeds as follows. In the next section the data and empirical set up are presented. This is followed by a discussion of results in section 3 and concluding remarks in section 4.

2. Data and Empirical Set-up

2.1. Data

The data used in estimation stem from two datasets provided by Statistics Sweden (SCB); the Follow-up Surveys of Pupils and the Longitudinal Database on Education, Income and Employment (LOUISE).¹⁰

⁸ Recent studies on Sweden find that students in schools with a high proportion of immigrants have lower grades all else equal and controlling for selection into those schools (Szulkin & Jonsson, 2005; Szulkin, 2006). Ethnic enclaves have also been found to negatively affect the probability of graduating from high school and attaining university degrees for children with immigrant backgrounds in Sweden (Grönqvist, 2006).

⁹See also Edin *et al.* (2003) and Fredriksson & Åslund (2005) for studies on Sweden.

¹⁰In Swedish: "Elevuppföljningen" and "En longitudinell databas kring utbildning, inkomst och sysselsättning (LOUISE)".

The Follow-up Surveys of Pupils are a series of surveys based on a sample of 16,060 students who graduated from nine-year compulsory school in the spring of 1988 in Sweden. The surveys were conducted in 1990, 1992 and 1995. This study is based primarily on the 1995 survey, which was conducted 7 years after compulsory school graduation although some information from the 1990 survey is also used. The 1995 survey samples the entire population of 7,080 students with immigrant backgrounds, defined as having one or both parents born abroad, who belong to the 1988 cohort. Of the 102,251 students who graduated in 1988 with Swedish backgrounds, a sample of 8,980 was surveyed using a stratified sampling procedure.¹¹ Non-response rates for students with Swedish backgrounds were 18 percent and for students with immigrant backgrounds, 25 percent. Due to non-response in certain strata of the sampling procedure, all estimations are weighted in order to represent the 1988 cohort of students.¹²

The work presented in this paper was completed in two stages. First, differences in youth labor market outcomes were examined based on a subset of respondents to the 1995 Follow-up Survey who also responded to the 1990 survey (we denote this dataset as the *1995 sub-sample*). This is done in order to access important information available in the 1990 survey only. Specifically, the 1990 survey contains information on grades at the compulsory school level and father's level of education not available in the 1995 survey. Grades in Swedish, at the compulsory school level, provide us with an important teacher assessed measure of Swedish language proficiency, which is correlated not only to future education choices but also to labor market outcomes.¹³ Note that the average characteristics of the 1995 sub-sample do not significantly differ from those of the 1995 survey respondents at large.¹⁴ The 1995 sub-sample consists of 5,253 individuals of which 3,120 have immigrant backgrounds.

Thereafter, in the second stage of the study, information on all respondents of the 1995 survey was merged to register data (LOUISE dataset) in order to follow education and employment outcomes for

¹¹ The sampling procedure is stratified after choice of upper secondary school and gender. Included in the strata are categories for "did not apply", "applied but not accepted", "admitted to special course" and "dropped out of upper secondary school".

¹² Non-response rate analysis indicates that individuals within the strata: "did not apply", "admitted to special course" and "dropped out of upper secondary school" have a higher share of individuals with foreign backgrounds in the sample compared to the population. Students with foreign background are also over represented in the strata "theoretical upper secondary school". Weights are used in calculations of mean values and in all estimations, calculated as the inverse probability of being included in the sample in each stratum.

¹³ Many studies rely on self-assessed language proficiency, which is afflicted by both measurement error and endogeneity problems in estimations on labor market status. Grades in Swedish are a more exogenously determined measure of language skills and used in the initial estimations of labor market status based on the 1995 sub-sample.

¹⁴ See Vilhelmsson (2002) for detailed description of the 1995 sub-sample and tests of sample selection.

this cohort until 2002. The majority of the cohort is 30 years of age in 2002 and believed to have permanently entered the labor market. LOUISE is a longitudinal database containing detailed register information on personal and demographic characteristics, education, income and employment for individuals 16 years and older who are registered as living in Sweden on December 31 of each year. For clarity, we denote this second dataset as the *matched data*.¹⁵

The cohort studied in this paper consists of individuals born in Sweden in 1972 with native or immigrant backgrounds (parents born abroad) as well as of individuals born abroad who immigrated to Sweden before 1988. The first generation immigrants in the sample are therefore at most 16 years of age on arrival to Sweden. Approximately 45 percent of the respondents with foreign backgrounds are immigrants, varying by ethnic background. As such, this cohort is not representative of the today's distribution of persons with immigrant backgrounds. Most noticeably, the sample has relatively few individuals with non-European backgrounds, especially when estimation is contingent on entirely domestic educations.¹⁶

2.2. Empirical set-up

Initially, differences in labor market status between immigrant and native youths are examined using the 1990-1995 sub-sample described above. These estimations aim to provide a picture of youth differences in labor market status between immigrants and natives in 1995 when the cohort estimated on is 23 years of age. Of particular interest is to determine to what degree differences in labor market status are explained by varying proficiency in Swedish language skills as measured by grades, type of secondary school education and immigration after school start, i.e., by partially non-domestic education. These initial estimations are therefore not contingent on immigration prior to primary school start in order to confirm the importance of migration before school start at age six.¹⁷

The dependent variable denoting labor market status in 1995 is obtained from the 1995 survey and allows for five mutually exclusive alternatives: employed, unemployed, in labor market programs,

¹⁵As the two stages of this study were completed during different time periods, the two datasets, although based on the same cohort of students, were administered separately by Statistics Sweden and cannot be matched to each other. More specifically, the 1995 survey data matched to the 1990 survey (1995 sub-sample) constitutes one dataset and the matched survey-register data (matched data) another dataset. However, both datasets stem from the same cohort of students responding to the 1995 Follow-up Survey. The two datasets cannot be linked to each other, due to separate randomized identification numbers, implying that survey information from 1990 from the 1990-1995 sub-sample cannot be used in estimation based on the matched data from 1995 to 2002.

¹⁶On average, foreign-born survey respondents have lived in Sweden for 15 years in 1995 when they are 23 years of age.

¹⁷ All foreign born members of the 1988 cohort surveyed did however migrate to Sweden before the age of 16.

studying or out of the labor force.¹⁸ Weighed multinomial logit models are estimated with *employed* as the reference category.

In order to ascertain if labor market outcomes vary by ethnic background, four broad categories are defined according to own and parents region of birth: Swedish, Nordic, European and Non-European.¹⁹ Information on country of birth is aggregated in the data prohibiting a detailed categorization of national background. However some information is available about the composition of each region. Approximately 70% of the Nordic have a Finnish background and 30% a Norwegian background. The European category is composed of persons from the original EU15, excluding Sweden and the Nordic countries (approx. 30%), former Yugoslavia (30%) and Poland (15%). Non-Europeans have backgrounds in South America (25%), Turkey (20%), the Middle East and other Asian countries (approx. 34%). Less than 10 % of those with Non-European backgrounds have an African (including North African) background.²⁰ A separate category is defined for those with one Swedish parent and one foreign-born parent, dubbed *one native parent*. Individuals with mixed foreign backgrounds (parents born in differing foreign regions) are dropped from estimation (127 observations).

A number of variables potentially important in determining labor market status are controlled for in estimation.²¹ In the initial estimations, as the respondents are still relatively young and unlikely to have completed university degrees, education is controlled for by measures indicating type of secondary education (theoretical or vocational) and completion of a university-level course (some university). Final grades in Swedish at the compulsory school level are included in estimation in order to control for a teacher assessed measure of potential differences in Swedish language proficiency. A dummy variable for high marks in Swedish is created, equal to one if underlying grades exceed three on a five-point scale and zero otherwise.²² Average final compulsory school grades are also used to control for general differences in educational achievement.

¹⁸More specifically respondents are asked: *What was your main activity during the week of February 13-19, 1995?*

¹⁹Among Individuals with missing information on one parent's country of origin have been coded according to the other parent's country of origin.

²⁰ The composition of respective background changes when estimation is contingent on entirely domestic educations.

Fifty percent of the Non-European group then consists of individuals with Turkish backgrounds, 25 percent with South American and only approximately 4 percent with African backgrounds.

²¹ See description of variables in Appendix, Table A1.

²²Some students with immigrant backgrounds attended Swedish as a second language courses. In order to be coded as having high marks in Swedish, these students must have grades exceeding 4 on the five-point scale. Results presented are robust to alternative measures for grades in Swedish such as a continuous measure or more detailed categorizations.

Differences in family backgrounds are measured by parental education and household socio-economic status. Parental education is measured by father's level of education and coded into five mutually exclusive categories measuring less than 7 years of education, 7-9 years, 9-12 years or more than 12 years of education. In addition, an unknown category on father's education is included in estimation capturing those with missing information on education. Household socio-economic status is defined according to parents' socio-economic status in 1990.

Gender and residence in a major urban area are also included in estimation as well as survey measures for parental encouragement and individual satisfaction with compulsory school. Parental encouragement aims to capture perceived parental aspirations directly as parental education and socio-economic status are not always congruent in a labor market characterized by high unemployment and widespread underemployment for first generation immigrants. A measure for individual satisfaction with compulsory school is included in estimation in order to capture motivation for further studies and how well immigrant students, in particular, adapt to the Swedish school system. Finally, duration of residence in Sweden is measured by three dummy variables indicating whether or not respondents are born in Sweden, immigrated before school starting age or immigrated after school start.²³

-- Table 1 --

In the second stage of the analysis, the cohort is followed until 2002 in order to determine the persistence of ethnic employment differentials. Attention is shifted to specifically analyzing if entirely domestic educations eliminate employment gaps between those with Swedish and immigrant backgrounds. As such, estimation is based on those with entirely domestic educations implying that immigrants arriving in Sweden after 1977 (after primary school start) are dropped from estimation.²⁴ The final sample used in the second stage of the analysis, based on matched survey-register data for 1995-2002, consists of 7,116 individuals of which 2,470 have immigrant backgrounds. As noted above, mean characteristics of the 1995 survey respondents do not significantly vary from those of the 1995 sub-sample.

²³Reported results are robust to alternative measures of duration or residence such as a finer categorization at five levels and a continuous measure.

²⁴ 1,465 respondents from the 1995 survey are dropped from estimation for this reason.

The outcome variable in the second stage of analysis uses Statistics Sweden's (SCB) measure of employment status defined as a dichotomous 0/1 variable equal to one if individuals have worked at least one hour or have positive labor income during a measurement week in November of any given year and zero otherwise. Variations of the following basic model are estimated:

$$E_{it} = \alpha_i + \beta_1' EB_i + \beta_2' X_{it} + \varepsilon_{it}$$

where E_{it} is employment status for individual i at time t , EB is the ethnic background of individual I (Swedish, Nordic, European, Non-European), X_{it} is a vector of control variables and ε_{it} denotes the idiosyncratic error term. Employment and income equations are estimated by year with standard errors corrected for any unknown form of heteroscedasticity.

Employment equations control for attained levels of education, coded at three aggregation levels where the one-digit level indicates completed degrees at five basic levels; completion of compulsory school (9-10 years), secondary school (gymnasium or high school), short post-secondary school, university degree and doctorate degree.²⁵ A second four-digit measure of education is also used in estimation. This second measure focuses specifically on field of education. The first and second aggregation level describes field of education broadly, while the third and fourth aggregation level use the finer categorization developed by UNESCO, EUROSTAT and the OECD to define field of education and training in over 300 possible categories. This alternative education variable is defined from the year 2000 and forward. The last registered field of education in 2002 is therefore used in estimation. Systematic differences in level and field of education between ethnic groups are also explored in separate education equations.

Other control variables include gender, residence in a major urban area, marital status, the presence of small children (0-3 years old), household socio-economic status and immigration status (born in Sweden/immigration prior to school start).

-- Table 2 --

Descriptive statistics are shown in Table 1 and 2 for each data set. Initial differences in youth labor market status 1995 can be seen in Table 1. While over 50% of those with Swedish or Nordic

²⁵ Information on years of education is not directly available in the data, although a rough measure can be derived from the education codes. Instead we focus on detailed education codes that indicate both level and field of education.

backgrounds are employed in 1995, a much smaller proportion of those with European and Non-European backgrounds are employed. Individuals with one native parent lie closer to the Swedish and Nordic in terms of employment levels. In comparison to those with Nordic backgrounds, a larger proportion of those with European and Non-European backgrounds are still in school in 1995. Note that a fairly low proportion of Nordic fathers have educations longer than 12 years while a fairly high proportion of the Swedish and Non-Europeans come from academic families. A large proportion of Non-Europeans are born abroad, the majority of which immigrated to Sweden after school start implying that a large proportion of those with Non-European backgrounds are dropped from the latter estimations contingent on entirely domestic educations.

Sample means in Table 2 for the matched data indicate some differences in employment status 1995 even for those with entirely domestic educations. A lower proportion of those with Non-European backgrounds are employed in comparison to those with Swedish backgrounds.

3. Results

3.1. Youth Labor Market Status in 1995

Table 3 shows the relative risk ratios for a weighted, multinomial logit models on labor market status in 1995.²⁶ Employed is the reference category for labor market status. Results from Model 1, which control for ethnic background only, show that Non-Europeans are significantly more likely to be in labor market programs, unemployed, in school and out of the labor force rather than being employed in comparison to those with Swedish backgrounds. Europeans are significantly more likely to be unemployed and out of the labor force. No other significant differences are found by ethnic background in this first model.

-- Table 3 here: Labor Market Status 1995 --

More specifically, in comparison to those with Swedish background, Non-Europeans are 3.2 times more likely to participate in a labor market program than be employed. In terms of unemployment status, significantly higher relative risk ratios are found for both Europeans and Non-Europeans, although the magnitude for Non-Europeans (3.9) is considerably larger than that found for Europeans (1.8). Relative the reference group, the probability of attending school rather than being employed is lower for those with Nordic backgrounds (weakly significant) and higher for those with

²⁶The relative risk ratio (RRR) is a transformation of the coefficients (β) in the multinomial logistic model ($RRR=e^{\beta}$). This transformation is used in order to facilitate interpretation of coefficient values.

European (weakly significant) and Non-European backgrounds. Finally, the estimated relative risk of being out of the labor force, for reasons other than attending school, as opposed to working, is three times higher for those with European and Non-European backgrounds than for those with Swedish backgrounds.

Model 2 controls for gender, residence in a major urban area, education (level and grades), father's education and immigration status. Reported labor market gaps between ethnic groups are not altered by the inclusion of these control variables in the estimated model, although some coefficient estimates significantly differ in magnitude from model 1. Results show that both forms of secondary schooling (vocational and theoretical) and some university study are associated with lower risks of unemployment in comparison to a compulsory school education only. Immigration after school start is associated with a higher risk of unemployment, rather than employment, in comparison to those born in Sweden. A vocational secondary school education is associated with lower risks of being a student in 1995 and theoretical secondary school with higher risks. Having some university education is associated with a lower risk of still being in school 1995. Higher grades in Swedish are associated with considerably higher risks of being in school as are higher levels of father's education.²⁷ Immigrating after school start is also associated with a higher risk of still being in school. Finally, women are more likely than men to be out of the labor force. All forms of post compulsory school education are associated with lower risks of being out of the labor force.

It is important to note that controlling for a teacher assessed measure of Swedish language proficiency, via final grades in Swedish at the compulsory school level, does not explain labor market disparities found between those with Swedish and those with European and, especially, Non-European backgrounds in this cohort, neither does immigration status.²⁸ These are two of the most commonly forwarded explanations for labor market gaps between immigrants and natives. In the final model, two variables were added measuring parental encouragement for further studies and individual school satisfaction. Inclusion of these variables does not alter previously reported results on labor market gaps. In addition, parental encouragement and individual school satisfaction are found to be insignificantly associated with labor market outcomes.²⁹

²⁷ The unknown category for father's education is also associated with a weakly significant higher risk of being in school. Results are not altered by controlling for socio-economic status rather than father's education as an indicator of family background in estimated models.

²⁸ Separate estimations (not shown) controlling for average final grades in compulsory school do not alter reported results.

²⁹ Estimations of the above model on each background group separately yield some interesting differences in coefficients between groups. Among those with Nordic and European backgrounds, women are more likely to be in school than their male counterparts. European women insignificantly differ from European men in the risk of being out of the labor force.

3.2. The Probability of Being Employed 1995-2002

The next stage of the analysis focuses on following up the 1988 cohort until 2002 in order to determine the persistence of initial labor market gaps between immigrants and natives. The outcome variable in these estimations is register-based information on employment. In 2002, our cohort of students is 30 years of age and likely to have permanently entered the labor market. Any initial differences in employment accruing from for example, longer spells in education, should at this point be minimal.

The preceding analysis on initial youth labor market outcomes clearly showed that immigration after school start is associated with significantly higher risks of unemployment as well as higher risks of being in school rather than employed in 1995. For the remainder of the analysis we focus on a subsample of the cohort with entirely domestic educations. Students that immigrated after school start are thus dropped from estimation. This restriction primarily affects the number and composition of those with non-European backgrounds.

The probability of being employed is estimated by weighted linear probability models for each year using register data on employment status and controlling for gender, residence in a major urban area, marital status, immigration before school start, small children, five levels of educational attainment and socio-economic background. Results presented in Table 4 show that only those with Nordic backgrounds close the employment gap, over time, to those with Swedish backgrounds. Differences in employment probabilities are insignificant for the Nordic from 1998 to 2002. Europeans show an employment gap for a large part of the time period, but differences are small and weakly significant towards the end of the period. Those with Non-Europeans backgrounds however, are associated with persistent, large and significantly lower employment probabilities in comparison to those with Swedish backgrounds (insignificant in 1999), from 15 percent lower in 1995 to 12 percent lower in 2002.

Other results are expected, women are associated with lower employment probabilities than men. Marriage is associated with lower employment probabilities during the early part of the time period. Higher educations, with the exception of short post-secondary degrees, are associated with higher

Among the Nordic, those with high grades in Swedish are less likely to be out of the labor force than those with lower grades. Europeans with high grades in Swedish also have a lower risk of unemployment. Other results are in line with those reported above for the entire cohort.

employment probabilities in comparison compulsory school educations only. These differences are less noticeable towards the end of the period.

-- Table 4 here --

3.3. Educational Choices after Compulsory School

3.3.1. Level of Education

Although level of education, at an aggregated level, does not explain significant and persistent employment gaps for those with Non-European backgrounds, it is of interest to determine to what degree systematic differences in post-compulsory school education exist between ethnic groups, both in terms of level and field of education. Beginning with level of education, Table 5 shows results from weighted linear probability models on the probability of attaining a secondary school (columns 1-3) or a university degree (columns 4-7). Note that short post-secondary school educations are coded together with secondary school educations. Results indicate that Non-Europeans are significantly less likely than those with Swedish backgrounds to complete secondary school educations. This result does not change with the inclusion of demographic variables and controls for socio-economic background.³⁰ In terms of the probability of completing a university degree, again those with Non-European as well as those with Nordic backgrounds are significantly less likely than those with Swedish backgrounds to attain university degrees. Differences to Swedes disappear for Non-Europeans with the inclusion of controls for socio-economic background and for the Nordic with the inclusion of controls for type of secondary school (vocational or theoretical) and average final grades in secondary school.

-- Table 5 here --

3.3.2. Field of Education

³⁰ Based on data on initial admittance records in 1988, differences between ethnic groups in the propensity to attend vocational or theoretical secondary schools are also estimated. Results, presented in Table A2 in the appendix, show that the Nordic are more likely to attend vocational school than those with Swedish backgrounds and Non-Europeans less likely to do so (weakly significant). Controlling for differences in demographic variables eliminates differences for Non-Europeans whereas differences for the Nordic disappear first with controls for socio-economic background. The Nordic are also found to be significantly less likely to attend theoretical secondary schools (as are those with one native parent) and those with European backgrounds significantly more likely to do so. The latter result is found only when controls for demographic characteristics and socio-economic background are included in the model.

Given attained levels of education, field of education may also vary between groups. In order to roughly determine possible ethnic differences in field of education, eight broad fields are defined (one digit level of the 4-digit register data on field of education) and separate weighted linear probability models on each field of education estimated.³¹ Table 6 shows results for field of education for those with secondary school (and short post-secondary) degrees and Table 7 results for university educations. Two models are estimated for each given field of education, one showing unadjusted average differences between ethnic groups, the other controlling for demographic characteristics and socio-economic background. Results in Table 6 for those with secondary school educations show that the Nordic are less likely to have concentrate in the humanities/arts, social sciences, natural sciences and agriculture but more likely to have concentrations in health care and engineering than those with Swedish backgrounds. Europeans are less likely to have educations in the humanities and services but more likely to be in social sciences. Non-Europeans are less likely to concentrate in the natural sciences, engineering and agriculture but more likely to concentrate in the social sciences than Swedes.³² Some of these differences disappear in the more detailed model specification, indicating the importance of, for example, socio-economic background on educational choices at secondary school.

-- Table 6 here --

Results in Table 7 show significant differences between ethnic groups in field of education for university educations. Results indicate that relative to those with Swedish backgrounds, the Nordic are less likely to focus on social sciences, agriculture, health care and services, Europeans are less likely to focus on education/pedagogy, agriculture and services and Non-Europeans less likely to choose education/pedagogy, natural sciences and services but more likely to choose health care. The fact that services are less likely to be the chosen field of education for all groups with immigrant backgrounds may be due to the fact that university degrees in this field are, among others, within the armed forces and the police corps.

-- Table 7 here --

³¹The eight defined fields of education are: Education/Pedagogy, Humanities/Art, Social Sciences/Law/Economics, Natural Sciences/Math/Computers, Engineer/Production/Manufacturing, Agriculture/Forestry/Animal Care, Health Care/Social Work, Services/Transport/Security.

³² This result differs from that presented in Ekberg & Rooth (2004) on first generation immigrants indicating that these migrants over-represented in technical fields and health care.

3.3.3. Valued Education

A summary measure of potential differences in education between individuals with Swedish and immigrant backgrounds can be constructed based on earnings, i.e., based on how the market has remunerated different combinations of level and field of education. The idea is to estimate income equations for those with Swedish backgrounds controlling for a detailed measure of level and type of education. The estimated coefficients for education are then used to predict earnings for those with immigrant backgrounds. This measure, denoted valued education, remunerates those with immigrant backgrounds for their actual educations according to how Swedes are remunerated for their educations.³³ Income equations were estimated for the year 2002 based on 262 categories for education (level and type), controlling also for gender. Ethnic differences in valued education are then estimated for the year 2002.

-- Table 8 here --

Results presented in Table 8 show that for the entire sample (column 1) only those with Nordic backgrounds have significantly lower valued educations in comparison to those with Swedish backgrounds. This difference disappears when controls for demographic characteristics and socio-economic background are included in the model. Few ethnic differences in valued education are found for those with secondary schools only (column 3 and 4). Those with European backgrounds have higher valued educations when controlling for differences in socio-economic background. Finally, among university graduates (column 5 and 6), the Nordic and those with one native parent are found to have significantly lower valued educations in comparison to those with Swedish backgrounds. This difference disappears for the Nordic with controls for socio-economic background.

In summary, although there are some ethnic differences in level and type of education as seen by estimations on the probability to pursue further education as well as on the propensity to study certain (aggregated) fields of education, few differences in valued education are noted. The only unadjusted difference noted is that valued education is lower for those with Nordic backgrounds. This is important as it indicates that differences in education alone are unlikely to provide a convincing explanation for ethnic differences in labor market outcomes, especially as educations are entirely domestic.

³³ A similar measure of valued education is used for example in Björklund & Sundström (2006) and Böhlmark (2007).

3.4. Employment and Field of Education

Table 9 reports results of estimated employment equations for the year 2002 controlling for the most detailed information on level and field of education available (four digit level). Results for the entire sample (column 1) indicate that systematic variation in domestic education does not explain ethnic employment gaps. In comparison to the results presented earlier in Table 4 for the year 2002, a detailed control for level and field of education does not significantly alter the result that a Non-European background is associated with approximately 11 percent lower employment probabilities in comparison to a Swedish background. As seen in column 2 and 3, employment gaps are driven by differences between those with at most secondary (and short post-secondary school educations). No significant ethnic employment gaps are found for the university educated.

-- Table 9 here --

Employment equations by year and level of education confirm this result. Employment differentials to Swedes over time are found above all among individuals with at most secondary or short post-secondary degrees. Employment gaps among the university educated are smaller and less persistent (see Table A3 in Appendix).³⁴

Although employment gaps disappear for the university educated, our employment data say nothing about the quality of occupations for the employed. It is possible that those with Swedish and immigrant backgrounds systematically sort into high and low quality jobs. In the next section we therefore explore possible income gaps between those with Swedish and immigrant backgrounds among the employed.

3.5. Income Gaps

Income is measured as gross labor income and/or gross income from business activities. Income equations are estimated for each year and separately by level of education (secondary school only or university).³⁵ Results presented in Table 10 show persistent income gaps to natives for Non-Europeans with secondary (or short post-secondary) educations only. Those with Non-European

³⁴ Note that the number of individuals with completed university degrees is small in the beginning of the observation period, especially for those with Non-European backgrounds.

³⁵ Log-linear income equations are estimated implying that coefficient estimates are interpreted as the percentage change in income of having a non-Swedish ethnic background.

background have 70 percent lower incomes than those with Swedish backgrounds in 1995. This difference decreases to 50 percent difference (approximately) in 2002.

For the university educated, no significant income gaps are found over time between those with Swedish and those with immigrant backgrounds. Although hours of work may vary between the different ethnic groups, this result nonetheless suggests that the quality of employment does not.

-- Table 10 here --

4. Conclusions

Based on survey data from 1995 on a cohort of students who graduated from Swedish compulsory school in 1988 as well as matched register data from 1995 to 2002, this study analyses both initial differences in youth labor market outcomes and the persistence of employment gaps over time between students with Swedish and immigrant backgrounds. Results indicate both initial differences in youth labor market status and long term differences in employment for especially those with Non-European backgrounds.

In 1995, Non-Europeans are significantly more likely to be in labor market programs, unemployed, in school and out of the labor force rather than being employed in comparison to those with Swedish backgrounds. These estimations control for among other characteristics, a teacher assessed measure of Swedish language proficiency, immigration before or after school start and household socio-economic status, some of the most commonly forwarded explanations for ethnic youth disparities in labor market outcomes.

Based on a sub-sample of the cohort with entirely domestic educations, employment outcomes are followed until 2002 when the majority of the cohort are 30 years of age and believed to have permanently entered the labor market. Employment gaps to those with Swedish backgrounds are found to be especially persistent for Non-Europeans, not disappearing even with very detailed controls for level and field of education. However, employment gaps are driven by differences found among those with maximum secondary or post-secondary school educations. No employment gap was found between those with Swedish or immigrant backgrounds among the university educated.

Higher domestic education therefore does appear to even out the playing field between those with Swedish and immigrant backgrounds. Given a university education, no employment or income gaps

are found for this cohort, one of the first cohorts in Sweden that can follow persons with Non-European backgrounds and entirely domestic educations from compulsory school through post-compulsory school education and into the labor market. Although these results can only be deemed as positive, at age 30, these individuals are still in the initial phases of their career paths and need to be followed further in order to determine whether promotion paths, on the job training and other factors introduce systematic differences in income thereafter.

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Table 1: Sample Means, 1995 Sub-Sample

| Background: | Swe dish | Nordic | European | Non-European | One Native Parent |
|--|---------------------|---------------|-----------------|---------------------|------------------------------|
| Labor Market Status: | | | | | |
| Employed | 0.53 | 0.55 | 0.39 | 0.31 | 0.48 |
| Unemployed | 0.09 | 0.13 | 0.12 | 0.21 | 0.31 |
| Labor Market Program | 0.02 | 0.03 | 0.02 | 0.05 | 0.04 |
| Studying | 0.30 | 0.21 | 0.32 | 0.32 | 0.31 |
| Out of the Labor Force | 0.06 | 0.08 | 0.15 | 0.11 | 0.08 |
| Female | 0.51 | 0.53 | 0.49 | 0.44 | 0.42 |
| Big City | 0.32 | 0.27 | 0.62 | 0.64 | 0.37 |
| Immigration before school start | -- | 0.17 | 0.09 | 0.37 | 0.10 |
| Immigration after school start | -- | 0.05 | 0.19 | 0.56 | 0.06 |
| Education: | | | | | |
| Compulsory School | 0.16 | 0.16 | 0.10 | 0.08 | 0.16 |
| Vocational Secondary | 0.64 | 0.59 | 0.61 | 0.63 | 0.62 |
| Theoretical Secondary | 0.16 | 0.18 | 0.27 | 0.26 | 0.15 |
| Some University | 0.06 | 0.10 | 0.06 | 0.08 | 0.10 |
| Grades in Compulsory School (1988): | | | | | |
| Swedish: high grades | 0.39 | 0.28 | 0.37 | 0.15 | 0.31 |
| High avg. final grades | 0.66 | 0.56 | 0.68 | 0.53 | 0.62 |
| Fathers Education: | | | | | |
| < 7 years | 0.07 | 0.16 | 0.19 | 0.26 | 0.06 |
| 7 – 9 years | 0.37 | 0.42 | 0.28 | 0.14 | 0.37 |
| 10 – 12 years | 0.18 | 0.14 | 0.21 | 0.11 | 0.15 |
| > 12 years | 0.27 | 0.14 | 0.22 | 0.23 | 0.27 |
| Unknown | 0.09 | 0.13 | 0.10 | 0.26 | 0.16 |
| Socio-economic Status: | | | | | |
| Unskilled blue-collar | 0.18 | 0.31 | 0.31 | 0.33 | 0.23 |
| Skilled blue-collar | 0.13 | 0.27 | 0.19 | 0.13 | 0.19 |
| Lower and middle ranking white-collar | 0.30 | 0.15 | 0.12 | 0.09 | 0.28 |
| High ranking white- Collar | 0.31 | 0.12 | 0.14 | 0.10 | 0.18 |
| Undefined | 0.05 | 0.05 | 0.10 | 0.06 | 0.03 |
| No. of observations | 2,133 | 789 | 542 | 500 | 1,289 |

Note: Grades in Swedish at the compulsory school level includes Swedish as a second language studied by 40 individuals in the cohort. A high grade in Swedish is defined as a grade in the regular Swedish course exceeding 3 on a 5-point scale or exceeding 4 in Swedish as a second language. Weighted means.

Table 2: Sample Means, Matched Data (1995)

| Background: | Swe dish | Nordic | European | Non-European | One Native Parent |
|--------------------------------------|---------------------|---------------|-----------------|---------------------|------------------------------|
| Employed | 0.66 | 0.64 | 0.58 | 0.52 | 0.65 |
| Labor Income | 973 | 972 | 867 | 581 | 930 |
| Demographic Variables: | | | | | |
| Female | 0.47 | 0.47 | 0.40 | 0.41 | 0.43 |
| Big City | 0.19 | 0.24 | 0.44 | 0.37 | 0.26 |
| Married | 0.30 | 0.30 | 0.46 | 0.64 | 0.29 |
| Small children | 0.10 | 0.17 | 0.08 | 0.17 | 0.11 |
| Early immigrant | 0.002 | 0.22 | 0.10 | 0.86 | 0.03 |
| Education: | | | | | |
| Compulsory School | 0.10 | 0.17 | 0.12 | 0.19 | 0.14 |
| Secondary | 0.62 | 0.65 | 0.59 | 0.56 | 0.61 |
| Short Post-Secondary (< 2 years) | 0.26 | 0.17 | 0.27 | 0.23 | 0.24 |
| Long Post-Secondary (> 2 years) | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 |
| No. of observations | 4,646 | 1,112 | 496 | 153 | 709 |

Note: Income is measured in 100 SEK. "Small children" denotes the presence of children under the age of three in the household. Weighted means.

Table 3: Labor Market Status, 1995 (1995 Sub-sample).

| | Model 1 | | | | | Model 2 | | | | |
|---|---------------------|---------------------|---------------------|---------------------|--|---------------------|---------------------|---------------------|---------------------|---------------------|
| Reference category: Employed | Labor mkt. program | Unemp | School | Out of Labor Force | | Labor mkt. program | Unemp | School | Out of Labor Force | Labor mkt. program |
| Ethnic Background (reference category: Swedish): | | | | | | | | | | |
| Nordic | 1.144 (0.339) | 1.352 (0.316) | 0.694 (0.155)* | 1.286 (0.345) | | 1.239 (0.440) | 1.100 (0.278) | 0.923 (0.221) | 1.183 (0.324) | 1.087 (0.453) |
| European | 1.255 (0.414) | 1.824 (0.319)*** | 1.419 (0.307) | 3.060 (1.481)** | | 1.464 (0.521) | 1.726 (0.372)*** | 1.346 (0.344) | 3.550 (1.840)*** | 1.333 (0.484) |
| Non-European | 3.246 (0.981)*** | 3.924 (0.659)*** | 1.838 (0.242)*** | 2.922 (0.574)*** | | 3.556 (1.551)*** | 2.266 (0.643)*** | 1.943 (0.474)*** | 3.012 (0.949)*** | 3.090 (1.339)*** |
| One Native P. | 1.780 (0.719) | 1.035 (0.250) | 1.134 (0.213) | 1.463 (0.399) | | 1.824 (0.806) | 0.902 (0.252) | 1.290 (0.284) | 1.484 (0.469) | 1.676 (0.704) |
| Female | -- | -- | -- | -- | | 0.893 (0.264) | 1.026 (0.183) | 1.208 (0.166) | 1.714 (0.380)** | 0.895 (0.270) |
| Big City | -- | -- | -- | -- | | 0.622 (0.202) | 0.876 (0.176) | 1.043 (0.142) | 0.834 (0.170) | 0.652 (0.217) |
| Education (reference category: Compulsory School): | | | | | | | | | | |
| Vocat (sec.) | -- | -- | -- | -- | | 0.824 (0.378) | 0.640 (0.123)** | 0.646 (0.115)*** | 0.333 (0.073)*** | 0.888 (0.430) |
| Theo (sec.) | -- | -- | -- | -- | | 0.919 (0.401) | 0.348 (0.090)*** | 1.946 (0.325)*** | 0.332 (0.081)*** | 0.997 (0.460) |
| Some Uni. | -- | -- | -- | -- | | 0.396 (0.436) | 0.162 (0.117)*** | 0.307 (0.147)*** | 0.275 (0.169)** | 0.425 (0.476) |
| Swedish Lang. proficiency | -- | -- | -- | -- | | 1.747 (0.636) | 0.774 (0.190) | 2.781 (0.419)*** | 1.196 (0.291) | 1.665 (0.614) |
| Father's education (reference category: < 7 years): | | | | | | | | | | |
| 7-9 years | -- | -- | -- | -- | | 0.589 (0.368) | 0.984 (0.289) | 1.126 (0.296) | 0.909 (0.315) | 0.602 (0.374) |
| 10-12 years | -- | -- | -- | -- | | 0.473 (0.328) | 1.101 (0.367) | 1.722 (0.476)** | 0.923 (0.376) | 0.497 (0.344) |
| > 12 years | -- | -- | -- | -- | | 1.991 (1.201) | 1.219 (0.432) | 4.008 (1.091)*** | 1.516 (0.611) | 2.064 (1.277) |
| Unknown | -- | -- | -- | -- | | 1.774 (1.130) | 1.261 (0.430) | 1.838 (0.595)* | 1.167 (0.469) | 1.666 (1.069) |
| Immigration status (reference category: Born in Sweden): | | | | | | | | | | |
| Imm. before school start | -- | -- | -- | -- | | 0.651 (0.248) | 1.296 (0.283) | 1.154 (0.284) | 0.955 (0.249) | 0.707 (0.262) |
| Imm. after school start | -- | -- | -- | -- | | 1.204 (0.476) | 1.894 (0.444)*** | 1.730 (0.353)*** | 1.035 (0.313) | 1.343 (0.513) |
| Encouragement | -- | -- | -- | -- | | -- | -- | -- | -- | yes |
| School Satisfaction: | -- | -- | -- | -- | | -- | -- | -- | -- | yes |
| No. of obs. | 5253 | | | | | 5253 | | | | |
| Log Likelihood | -6270.18 | | | | | -5483.73 | | | | |

Relative risk ratios for weighted multinomial logit models.

Table 4: The Probability of Being Employed, 1995-2002 (Matched Data).

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Ethnic Background (reference category: Swedish): | | | | | | | | |
| Nordic | -0.056 (0.032)* | -0.065 (0.033)** | -0.052 (0.030)* | -0.037 (0.027) | 0.012 (0.021) | -0.001 (0.017) | -0.013 (0.016) | -0.028 (0.019) |
| European | -0.090 (0.040)** | -0.067 (0.047) | -0.028 (0.043) | -0.106 (0.045)** | -0.085 (0.042)** | -0.060 (0.030)** | -0.045 (0.026)* | -0.054 (0.030)* |
| Non-Europ. | -0.151 (0.062)** | -0.197 (0.058)*** | -0.150 (0.058)*** | -0.088 (0.047)* | -0.058 (0.043) | -0.101 (0.039)*** | -0.095 (0.036)*** | -0.116 (0.035)*** |
| One Nat Par | -0.026 (0.028) | -0.060 (0.028)** | -0.060 (0.027)** | -0.043 (0.024)* | -0.040 (0.023)* | -0.017 (0.020) | -0.034 (0.019)* | -0.056 (0.022)*** |
| Demographic Variables: | | | | | | | | |
| Female | -0.045 (0.017)*** | -0.046 (0.016)*** | -0.070 (0.016)*** | -0.078 (0.014)*** | -0.074 (0.013)*** | -0.082 (0.011)*** | -0.064 (0.011)*** | -0.055 (0.011)*** |
| Big city | -0.020 (0.022) | -0.024 (0.020) | -0.021 (0.019) | 0.027 (0.017) | -0.002 (0.016) | 0.005 (0.014) | 0.028 (0.013)** | 0.012 (0.014) |
| Married | -0.095 (0.020)*** | -0.089 (0.022)*** | -0.068 (0.022)*** | -0.022 (0.021) | 0.003 (0.019) | -0.028 (0.017)* | -0.003 (0.016) | 0.025 (0.016) |
| Early imm. | 0.021 (0.051) | 0.060 (0.045) | 0.020 (0.047) | 0.009 (0.033) | 0.020 (0.031) | 0.006 (0.021) | 0.004 (0.018) | 0.035 (0.017)** |
| Small child. | -0.070 (0.030)** | -0.046 (0.029) | 0.053 (0.026)** | 0.081 (0.023)*** | 0.025 (0.020) | 0.016 (0.018) | 0.022 (0.017) | 0.015 (0.016) |
| Education (reference category: Compulsory): | | | | | | | | |
| Secondary | 0.044 (0.023)* | 0.044 (0.023)* | 0.082 (0.023)*** | 0.091 (0.022)*** | 0.057 (0.020)*** | 0.007 (0.017) | -0.009 (0.016) | 0.006 (0.018) |
| Post-Second. | -0.212 (0.031)*** | -0.167 (0.030)*** | -0.122 (0.030)*** | -0.052 (0.028)* | -0.041 (0.026) | -0.114 (0.029)*** | -0.110 (0.029)*** | -0.098 (0.030)*** |
| University | 0.139 (0.059)** | 0.170 (0.039)*** | 0.184 (0.034)*** | 0.177 (0.029)*** | 0.145 (0.025)*** | -0.017 (0.021) | -0.008 (0.019) | -0.001 (0.020) |
| Ph.D | 0.000 (0.000) | 0.000 (0.000) | 0.285 (0.034)*** | 0.243 (0.025)*** | 0.177 (0.026)*** | 0.077 (0.023)*** | 0.067 (0.021)*** | 0.033 (0.054) |
| Socio-Economic Background | yes | yes | yes | yes | yes | yes | yes | yes |
| Constant | 0.828 (0.049)*** | 0.843 (0.047)*** | 0.799 (0.045)*** | 0.837 (0.039)*** | 0.906 (0.035)*** | 0.998 (0.029)*** | 1.020 (0.018)*** | 0.973 (0.024)*** |
| Observations | 7116 | 7116 | 7116 | 7116 | 7116 | 7116 | 7116 | 7116 |

* significant at 10%; ** significant at 5%; *** significant at 1%

Weighted linear probability models. Robust standard errors in parentheses.

Table 5: Level of Education, 2002 (Matched Data).

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|----------------------|----------------------|---------------------|----------------------|----------------------|---------------------|----------------------|
| | Secondary | Secondary | Secondary | University | University | University | University |
| Ethnic Background (reference category: Swedish): | | | | | | | |
| Nordic | -0.021 (0.014) | -0.023 (0.015) | -0.014 (0.018) | -0.123 (0.031)*** | -0.153 (0.032)*** | -0.079 (0.036)** | -0.056 (0.038) |
| European | -0.010 (0.023) | -0.012 (0.023) | 0.012 (0.026) | -0.002 (0.045) | -0.046 (0.046) | 0.079 (0.051) | 0.059 (0.043) |
| Non-Europ. | -0.095 (0.028)*** | -0.096 (0.032)*** | -0.078 (0.037)** | -0.109 (0.031)*** | -0.210 (0.053)*** | -0.076 (0.061) | -0.043 (0.054) |
| One nat par | -0.019 (0.014) | -0.020 (0.014) | -0.024 (0.015) | -0.033 (0.029) | -0.045 (0.029) | -0.022 (0.030) | 0.001 (0.031) |
| Female | | 0.035 (0.007)*** | 0.042 (0.007)*** | | 0.128 (0.017)*** | 0.143 (0.017)*** | 0.051 (0.017)*** |
| Big city | | 0.025 (0.008)*** | 0.012 (0.009) | | 0.167 (0.021)*** | 0.118 (0.022)*** | 0.037 (0.021)* |
| Married | | -0.034 (0.012)*** | -0.030 (0.012)** | | -0.031 (0.023) | -0.031 (0.022) | -0.022 (0.023) |
| Early imm | | 0.003 (0.020) | 0.012 (0.021) | | 0.094 (0.052)* | 0.069 (0.058) | 0.051 (0.045) |
| Small child. | | 0.025 (0.012)** | 0.024 (0.013)* | | -0.042 (0.024)* | -0.032 (0.023) | -0.029 (0.023) |
| Theo. Sec. | | | | | | | 0.153 (0.027)*** |
| Vocat. Sec. | | | | | | | -0.149 (0.025)*** |
| Avg. grades- Secondary | | | | | | | 0.003 (0.000)*** |
| Socio-econ. background | no | no | yes | no | no | yes | yes |
| Constant | 0.935 (0.004)*** | 0.921 (0.007)*** | 0.916 (0.025)*** | 0.359 (0.009)*** | 0.289 (0.014)*** | 0.337 (0.047)*** | -0.445 (0.060)*** |
| Observations | 7607 | 7607 | 7117 | 7607 | 7607 | 7117 | 5865 |

* significant at 10%; ** significant at 5%; *** significant at 1%

Weighted linear probability models of obtaining a secondary school or university degree. Robust standard errors in parentheses.

Table 6: Field of Education-Secondary School, 2002 (Matched Data).

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---------------------|--------------------|----------------------|----------------------|-----------------------------------|----------------------|-------------------------------------|---------------------|
| | Education/Pedagogy | | Humanities/Art | | Social Sciences/ Law/Economics | | Natural Sciences/ Math/Computers | |
| Ethnic Background (reference category: Swedish): | | | | | | | | |
| Nordic | -0.004 (0.003) | -0.003 (0.003) | -0.025 (0.006)*** | -0.026 (0.007)*** | -0.064 (0.017)*** | -0.072 (0.021)*** | -0.009 (0.005)* | -0.010 (0.006)* |
| European | -0.001 (0.005) | 0.002 (0.005) | -0.018 (0.010)* | -0.023 (0.013)* | 0.048 (0.029)* | 0.048 (0.033) | -0.003 (0.009) | 0.004 (0.010) |
| Non-European | 0.010 (0.013) | 0.018 (0.018) | -0.013 (0.016) | -0.022 (0.026) | 0.132 (0.045)*** | 0.072 (0.067) | -0.017 (0.009)* | -0.017 (0.008)** |
| One nat par | 0.005 (0.007) | 0.007 (0.008) | -0.018 (0.008)** | -0.017 (0.008)** | -0.020 (0.031) | -0.022 (0.031) | -0.003 (0.009) | -0.003 (0.010) |
| Demographic/ Socio-Econ. | no | yes | no | yes | no | yes | no | yes |
| Constant | 0.008 (0.002)*** | -0.011 (0.006)* | 0.039 (0.005)*** | -0.024 (0.019) | 0.210 (0.010)*** | 0.458 (0.331) | 0.025 (0.004)*** | 0.008 (0.011) |
| Observations | 4980 | 4634 | 4980 | 4634 | 4980 | 4634 | 4980 | 4634 |

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

| | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
|---|--|---------------------|--------------------------------------|----------------------|-----------------------------|----------------------|---------------------------------|----------------------|
| | Engineer/ Production/ Manufacturing | | Agriculture/Forestry/ Animal Care | | Health Care/ Social Work | | Services/Transport/ Security | |
| Ethnic Background (reference category: Swedish): | | | | | | | | |
| Nordic | 0.059 (0.033)* | 0.070 (0.027)** | -0.015 (0.003)*** | -0.013 (0.004)*** | 0.065 (0.030)** | 0.073 (0.033)** | 0.011 (0.018) | -0.014 (0.014) |
| European | -0.034 (0.038) | -0.031 (0.033) | -0.014 (0.010) | -0.008 (0.011) | 0.017 (0.042) | 0.022 (0.041) | -0.029 (0.010)*** | -0.047 (0.011)*** |
| Non-European | -0.083 (0.044)* | -0.027 (0.057) | -0.023 (0.002)*** | -0.022 (0.008)*** | -0.023 (0.027) | 0.042 (0.040) | 0.046 (0.029) | -0.033 (0.033) |
| One nat par | 0.020 (0.035) | 0.010 (0.028) | -0.010 (0.005)** | -0.006 (0.005) | 0.003 (0.021) | 0.012 (0.022) | 0.016 (0.016) | 0.015 (0.016) |
| Demographic/ Socio-Econ. | no | yes | no | yes | no | yes | no | yes |
| Constant | 0.379 (0.011)*** | 0.573 (0.044)*** | 0.023 (0.002)*** | 0.031 (0.006)*** | 0.114 (0.006)*** | -0.239 (0.033)*** | 0.064 (0.004)*** | -0.062 (0.019)*** |
| Observations | 4980 | 4634 | 4980 | 4634 | 4980 | 4634 | 4980 | 4634 |

* significant at 10%; ** significant at 5%; *** significant at 1%

Weighted linear probability models on field of education for those with secondary or short post-secondary educations only. Robust standard errors in parentheses.

Table 7: Field of Education-University Educations, 2002. (Matched Data).

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---------------------------|--------------------|-----------------------|-------------------|---|--------------------|---|---------------------|
| | Education/Pedagogy | | Humanities/Art | | Social Sciences/ Law/Economics | | Natural Sciences/ Math/Computers | |
| Ethnic Background (reference category: Swedish): | | | | | | | | |
| Nordic | -0.012 (0.047) | -0.042 (0.050) | 0.053 (0.047) | 0.064 (0.059) | -0.082 (0.032)** | -0.065 (0.038)* | 0.044 (0.080) | 0.088 (0.102) |
| European | -0.101 (0.029)*** | -0.060 (0.036)* | 0.017 (0.021) | 0.011 (0.026) | 0.052 (0.073) | 0.030 (0.074) | 0.005 (0.058) | 0.018 (0.062) |
| Non-European | -0.111 (0.043)*** | 0.008 (0.067) | 0.031 (0.038) | -0.047 (0.078) | -0.042 (0.052) | -0.038 (0.074) | -0.057 (0.027)** | -0.018 (0.045) |
| One nat par | 0.006 (0.050) | 0.033 (0.051) | 0.030 (0.025) | 0.021 (0.025) | 0.041 (0.046) | 0.036 (0.047) | -0.043 (0.021)** | -0.051 (0.023)** |
| Demographic/ Socio-Econ. | no | yes | no | yes | no | yes | no | yes |
| Constant | 0.206 (0.014)*** | 0.123 (0.108) | 0.056 (0.007)*** | 0.121 (0.117) | 0.207 (0.014)*** | 0.202 (0.160) | 0.093 (0.010)*** | 0.036 (0.016)** |
| Observations | 2058 | 1963 | 2058 | 1963 | 2058 | 1963 | 2058 | 1963 |

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|--|--------------------|--|---------------------|-------------------------------------|--------------------|---|---------------------|
| | Engineer/ Production/ Manufacturing | | Agriculture/Forestry/ Animal Care | | Health Care/ Social Work | | Services/Transport/ Security | |
| Ethnic Background (reference category: Swedish): | | | | | | | | |
| Nordic | 0.090 (0.083) | 0.063 (0.068) | -0.013 (0.003)*** | -0.006 (0.003)** | -0.052 (0.027)* | -0.085 (0.045)* | -0.028 (0.010)*** | -0.016 (0.011) |
| European | 0.092 (0.103) | 0.068 (0.088) | -0.013 (0.003)*** | -0.012 (0.005)** | -0.024 (0.039) | -0.027 (0.035) | -0.033 (0.010)*** | -0.032 (0.019)* |
| Non-Europ | 0.051 (0.060) | 0.053 (0.084) | 0.005 (0.018) | -0.009 (0.006) | 0.166 (0.065)** | 0.076 (0.125) | -0.044 (0.007)*** | -0.024 (0.014)* |
| One nat par | 0.005 (0.050) | -0.016 (0.044) | -0.004 (0.008) | -0.006 (0.009) | -0.009 (0.038) | 0.008 (0.038) | -0.025 (0.010)** | -0.025 (0.011)** |
| Demographic/ Socio-Econ. | no | yes | no | yes | no | yes | no | yes |
| Constant | 0.212 (0.014)*** | 0.262 (0.130)** | 0.013 (0.003)*** | 0.014 (0.006)** | 0.170 (0.013)*** | 0.020 (0.104) | 0.044 (0.007)*** | 0.222 (0.164) |
| Observations | 2058 | 1963 | 2058 | 1963 | 2058 | 1963 | 2058 | 1963 |

* significant at 10%; ** significant at 5%; *** significant at 1%

Weighted linear probability models on field of education for the university educated. Robust standard errors in parentheses.

Table 8: Valued Education, 2002 (Matched Data).

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|----------------------|----------------------|-------------------------|---------------------|---------------------|----------------------|
| | All | | Secondary School | | University | |
| Ethnic Background (reference category: Swedish): | | | | | | |
| Nordic | -0.050 (0.018)*** | -0.017 (0.017) | -0.027 (0.020) | -0.024 (0.018) | -0.103 (0.049)** | 0.022 (0.041) |
| European | 0.006 (0.024) | 0.013 (0.019) | 0.021 (0.017) | 0.027 (0.015)** | -0.030 (0.061) | -0.013 (0.040) |
| Non-Europ | -0.005 (0.025) | 0.007 (0.037) | 0.019 (0.024) | -0.007 (0.029) | -0.024 (0.076) | 0.072 (0.096) |
| One nat par | -0.024 (0.017) | -0.040 (0.016)*** | 0.010 (0.018) | 0.002 (0.013) | -0.089 (0.041)** | -0.108 (0.040)*** |
| Demographic/ Socio-Econ. | no | yes | no | yes | no | Yes |
| Constant | 7.495 (0.006)*** | 7.769 (0.083)*** | 7.491 (0.006)*** | 7.714 (0.026)*** | 7.527 (0.015)*** | 7.843 (0.056)*** |
| Observations | 7,607 | 1963 | 4980 | 4634 | 2058 | 1963 |

* significant at 10%; ** significant at 5%; *** significant at 1%

Weighted OLS estimations on valued education. Valued education denotes predicted income based on income regression controlling for detailed (four digit) category variables indicating level and field of education on individuals with Swedish backgrounds (predicted for all individuals with immigrant backgrounds). Robust standard errors in parentheses.

Table 9: The Probability of Being Employed Controlling for Field of Education, 2002
(Matched Data).

| | (1) | (2) | (3) |
|---|----------------------|----------------------|-------------------|
| | All | Secondary School | University |
| Ethnic Background (reference category: Swedish): | | | |
| Nordic | -0.023 (0.016) | -0.022 (0.020) | -0.020 (0.037) |
| European | -0.060 (0.028)** | -0.068 (0.026)*** | -0.000 (0.055) |
| Non-European | -0.111 (0.037)*** | -0.169 (0.053)*** | -0.093 (0.066) |
| One nat. parent | -0.040 (0.021)* | -0.075 (0.029)*** | 0.010 (0.035) |
| Demographic characteristics | yes | yes | yes |
| Socio-economic background | yes | yes | yes |
| Field of Education (4-digit level) | yes | yes | yes |
| Observations | 7116 | 4634 | 1963 |

* significant at 10%; ** significant at 5%; *** significant at 1%

Weighted linear probability models controlling for a education dummies indicating level and field of education at the four digit level. Robust standard errors in parentheses.

Table 10: Labor Income 1995-2002 (Matched Data)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------|----------------------|----------------------|
| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
| Secondary & Post-Secondary School Only | | | | | | | | |
| Ethnic Background (reference category: Swedish): | | | | | | | | |
| Nordic | -0.074 (0.074) | -0.089 (0.072) | -0.071 (0.073) | -0.041 (0.053) | 0.041 (0.040) | -0.008 (0.035) | -0.021 (0.036) | -0.019 (0.037) |
| European | -0.138 (0.107) | -0.035 (0.082) | 0.098 (0.102) | 0.065 (0.069) | -0.082 (0.111) | -0.138 (0.091) | -0.038 (0.054) | -0.130 (0.058)** |
| Non-Euro | -0.703 (0.187)*** | -0.548 (0.171)*** | -0.701 (0.196)*** | -0.425 (0.151)*** | -0.442 (0.151)*** | -0.365 (0.147)** | -0.355 (0.128)*** | -0.475 (0.172)*** |
| One Nat Par | -0.050 (0.086) | -0.109 (0.077) | -0.123 (0.085) | -0.093 (0.076) | -0.111 (0.068) | -0.139 (0.067)** | -0.082 (0.070) | -0.181 (0.103)* |
| Observations | 5676 | 5549 | 5568 | 5392 | 5338 | 4642 | 4583 | 4484 |
| University Education | | | | | | | | |
| Nordic | 0.079 (0.344) | 0.101 (0.138) | 0.020 (0.144) | 0.318 (0.171)* | 0.157 (0.109) | 0.270 (0.087)*** | 0.082 (0.159) | 0.035 (0.100) |
| European | -0.192 (0.281) | -0.470 (0.325) | -0.388 (0.290) | -0.513 (0.472) | -0.438 (0.242)* | 0.070 (0.093) | 0.114 (0.089) | 0.089 (0.123) |
| Non-euro | -0.501 (1.283) | 0.320 (0.315) | -0.088 (0.350) | 0.156 (0.414) | 0.212 (0.141) | -0.119 (0.193) | 0.027 (0.170) | -0.128 (0.176) |
| One nat par | -0.565 (0.482) | 0.038 (0.186) | -0.069 (0.234) | 0.093 (0.144) | 0.044 (0.098) | -0.104 (0.139) | -0.057 (0.084) | -0.097 (0.092) |
| Observations | 81 | 219 | 379 | 558 | 705 | 1691 | 1824 | 1932 |

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Weighted OLS estimations on log labor income controlling for demographic characteristics, education and socio-economic background. Robust standard errors in parentheses.

Appendix:

Table A1: Description of Variables

| Variables | Description |
|-------------------------------------|--|
| Outcome Variables: | |
| Labor Market Status (1995) | Labor market status based on 1995 survey question defined as five mutually exclusive category: Employed, Unemployed, in Labor Market Program, in School or Out of the Labor Market. |
| Employed | Register data on employment defined as working at least one hour or having positive income during a measurement week in November of each year, 1995-2002. |
| Labor Income | Gross labor income and/or gross income from business activities. Included are a number of work-related insurance benefits such as compensation for sick leave. |
| Ethnic Background: | |
| Swedish | Born in Sweden with native born parents |
| Nordic | Both parents from Nordic countries |
| European | Both parents from Europe, excluding the Nordic countries and including Oceania and North America |
| Non-European | Both parents born in Non-European countries |
| One Native Parent | One native-born parent and one foreign-born parent |
| Immigrant Status | Based on register data on immigration, defined into three categories: born in Sweden, immigration before school start (early immigrant), immigration after school start. |
| Demographic Variables: | |
| Female | Equal to 1 if the individual is female, 0 otherwise |
| Big City | Equal to 1 if the individual resides in a major urban area, 0 otherwise |
| Married | Equal to 1 if the individual is married (or cohabitating), 0 otherwise |
| Small Children | Equal to 1 if the individual has children aged 0-3, 0 otherwise |
| Education (survey data): | |
| Theoretical (secondary) | Theoretical secondary school |
| Vocational (secondary) | Vocational secondary school |
| Some university | Completion of a university level course |
| Education (register data): | |
| Compulsory | 9-10 years of basic compulsory education |
| Secondary | 2-3 years of gymnasium (high-school degree) |
| Post-Secondary | Post-secondary education, less than 2 years |
| University | Post-secondary education, more than 2 years |
| Graduate School | Graduate degree (Ph.D.) |
| Swedish Language Proficiency | Dummy variable for high final grades in Swedish, based on register data on education (Åk9 register). High grades are defined as exceeding 3 on a five point scale. |
| Grades-compulsory school | Average final compulsory school grades |
| Socio-Economic Background | Socio-Economic status of household, based on 1990 survey (Folk- och Bostadsräkningen 1990) |
| Encouragement | Based on 1990 survey question: How encouraged where you by your parents to pursue secondary school. Encouragement is categorized into five levels: Very much, A lot, Not much, Not at all. |
| School Satisfaction | Based on 1990 survey question: How well did you like compulsory school. Categorized into four groups: Very much, A lot, Not much, Not at all. |

Table A2: Type of Secondary School, Vocational or Theoretical (Matched Data).

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Vocational | Vocational | Vocational | Theoretical | Theoretical | Theoretical |
| Ethnic Background (reference category: Swedish): | | | | | | |
| Nordic | 0.061 (0.028)** | 0.084 (0.029)*** | 0.029 (0.032) | -0.122 (0.032)*** | -0.141 (0.032)*** | -0.064 (0.034)* |
| European | -0.049 (0.032) | -0.009 (0.032) | -0.116 (0.032)*** | 0.036 (0.042) | -0.007 (0.042) | 0.132 (0.048)*** |
| Non-Europ | -0.064 (0.033)* | 0.015 (0.044) | -0.077 (0.053) | -0.011 (0.036) | -0.077 (0.053) | 0.043 (0.063) |
| One nat par | 0.015 (0.025) | 0.025 (0.025) | 0.021 (0.025) | -0.058 (0.030)* | -0.071 (0.030)** | -0.061 (0.029)** |
| Female | | -0.116 (0.014)*** | -0.119 (0.014)*** | | 0.089 (0.017)*** | 0.109 (0.016)*** |
| Big city | | -0.158 (0.015)*** | -0.114 (0.016)*** | | 0.176 (0.020)*** | 0.114 (0.020)*** |
| Married | | 0.035 (0.019)* | 0.039 (0.020)** | | -0.066 (0.023)*** | -0.069 (0.023)*** |
| Early imm | | -0.068 (0.035)* | -0.057 (0.043) | | 0.052 (0.046) | 0.034 (0.057) |
| Small child. | | 0.032 (0.021) | 0.030 (0.021) | | -0.011 (0.025) | -0.003 (0.024) |
| Socio-Econ. Background | no | no | yes | no | no | yes |
| Constant | 0.354 (0.008)*** | 0.418 (0.013)*** | 0.417 (0.042)*** | 0.464 (0.009)*** | 0.417 (0.015)*** | 0.406 (0.048)*** |
| Observations | 7607 | 7607 | 7117 | 7607 | 7607 | 7117 |
| R-squared | 0.00 | 0.04 | 0.09 | 0.00 | 0.04 | 0.13 |

* significant at 10%; ** significant at 5%; *** significant at 1%

Weighted linear probability models on type of secondary school, vocational or theoretical. Estimations based on initial choice of secondary school in 1988 (upon completion of compulsory school). Robust standard errors in estimation.

Table A3: The Probability of Being Employed by Year and Level of Education (Matched Data).

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|----------------------|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|
| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
| Secondary & Short Post-Secondary School Only | | | | | | | | |
| Ethnic Background (reference category: Swedish): | | | | | | | | |
| Nordic | -0.058 (0.035) | -0.052 (0.037) | -0.063 (0.034)* | -0.036 (0.029) | 0.026 (0.021) | -0.001 (0.016) | -0.017 (0.016) | -0.031 (0.024) |
| European | -0.100 (0.041)** | -0.017 (0.045) | 0.011 (0.043) | -0.080 (0.048)* | -0.050 (0.041) | -0.088 (0.038)** | -0.071 (0.037)* | -0.068 (0.029)** |
| Non-Europ | -0.181 (0.066)*** | -0.215 (0.066)*** | -0.157 (0.067)** | -0.103 (0.054)* | -0.080 (0.053) | -0.127 (0.052)** | -0.114 (0.049)** | -0.164 (0.053)*** |
| One nat par | -0.014 (0.031) | -0.063 (0.031)** | -0.074 (0.031)** | -0.057 (0.029)** | -0.059 (0.029)** | -0.030 (0.024) | -0.061 (0.028)** | -0.089 (0.030)*** |
| Observations | 6190 | 6056 | 5904 | 5744 | 5608 | 4812 | 4719 | 4634 |
| R-squared | 0.09 | 0.07 | 0.06 | 0.05 | 0.03 | 0.05 | 0.04 | 0.04 |
| University Education | | | | | | | | |
| Nordic | -0.625 (0.255)** | -0.321 (0.231) | -0.116 (0.169) | 0.112 (0.056)** | 0.022 (0.031) | 0.015 (0.053) | 0.011 (0.045) | -0.015 (0.041) |
| European | -0.146 (0.179) | -0.425 (0.172)** | -0.333 (0.155)** | -0.218 (0.168) | -0.260 (0.141)* | -0.004 (0.067) | 0.022 (0.034) | 0.001 (0.057) |
| Non-Europ | -0.639 (0.469) | -0.164 (0.207) | -0.135 (0.171) | 0.129 (0.101) | -0.059 (0.084) | -0.093 (0.070) | -0.067 (0.057) | -0.078 (0.053) |
| One nat par | -0.529 (0.282)* | -0.103 (0.131) | 0.041 (0.070) | 0.036 (0.045) | 0.013 (0.031) | 0.005 (0.043) | 0.001 (0.028) | -0.015 (0.035) |
| Observations | 86 | 225 | 390 | 567 | 713 | 1745 | 1858 | 1963 |
| R-squared | 0.37 | 0.08 | 0.07 | 0.05 | 0.03 | 0.01 | 0.01 | 0.02 |

* significant at 10%; ** significant at 5%; *** significant at 1%

Weighted linear probability models controlling for demographic characteristics and socio-economic background. Robust standard errors in parentheses.



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