Aslund, Olof; Bohlmark, Anders; Skans, Oskar Nordstrom

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Olof Åslund, Anders Böhlmark and Oskar Nordström Skans

Centre for Research and Analysis of Migration
Department of Economics, University College London
Drayton House, 30 Gordon Street, London WC1H 0AX

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Age at migration and social integration

Olof Åslund†, Anders Böhlmark‡ and Oskar Nordström Skans*

† Institute for labor market policy evaluation (IFAU), CReAM, IZA and Uppsala University
‡ Institute for social research (SOFI) and CReAM
* IFAU, IZA and Uppsala University

Non-Technical Abstract

The paper studies childhood migrants and examines how age at migration affects their ensuing integration at the residential market, the labor market, and the marriage market. We use population-wide Swedish data and compare outcomes as adults among siblings arriving at different ages in order to ensure that the results can be given a causal interpretation. The results show that the children who arrived at a higher age had substantially lower shares of natives among their neighbors, coworkers and spouses as adults. The effects are mostly driven by higher exposure to immigrants of similar ethnic origin, in particular at the marriage market. There are also non-trivial effects on employment, but a more limited impact on education and wages. We also analyze children of migrants and show that parents' time in the host country before child birth matters, which implies that the outcomes of the social integra-tion process are inherited. Inherited integration has a particularly strong impact on the marriage patterns of females.

Keywords: Immigration, integration, segregation, age at migration, siblings.

JEL Classification: J12, J15, J13, J01.

Centre for Research and Analysis of Migration
Department of Economics, Drayton House, 30 Gordon Street, London WC1H 0AX
Telephone Number: +44 (0)20 7679 5888
Facsimile Number: +44 (0)20 7916 2775

Age at migration and social integration*

by

Olof Åslund[A], Anders Böhlmark[B] and Oskar Nordström Skans[C]

2009-10-29

Abstract

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[A] Institute for labor market policy evaluation (IFAU), CReAM, IZA and Uppsala University, olof.aslund@ifau.uu.se
[B] Institute for social research (SOFI) and CReAM, anders.bohlmark@sofi.su.se.
[C] IFAU, IZA and Uppsala University, oskar.nordstrom_skans@ifau.uu.se

1 Introduction

This paper concerns the social and economic integration of youths with immigrant background. This issue has received increasing political attention since many Western countries experience rapid changes in the demographic composition alongside a growing fear that socioeconomic disparities between ethnic groups may be persistent over generations. However, although there is a large literature describing patterns of ethnic segregation and economic differences between groups, researchers have paid surprisingly little attention to the situation for childhood migrants and the children of immigrants (Zhou, 1997).

This paper studies how age at migration affects social integration among these groups. Social integration is a broad phenomenon which captures educational and economic outcomes as well as more subtle dimensions such as the composition of people with whom immigrants live, work, and form families (see e.g. Zhou 1997 and Waldinger and Feliciano 2004). Our analysis builds on a Swedish population-wide data set which allows us to analyze the integration on three different social arenas: the residential market (neighbors), the marriage market (spouses) and the labor market (colleagues), all of which are areas which have never previously been studied in relation to the effects of age of migration. In addition we analyze the impact of age at migration on education, employment and wages.

In fact, to the best of our knowledge, no previous study has studied all these markets within a unified empirical framework. A second innovation is that we are able to study both childhood immigrants and children of migrants. The latter group allows us isolate the effects of parental time in the host country, and we are therefore able to study whether integration is inherited. A third advantage is that parent-child links in the data allow us to exploit the variation between siblings to control for all family-specific factors which potentially affect the outcomes of the immigrant children. Thus, we are able to handle the impact of unobserved family characteristics which may be correlated with children's age at migration.

A vast number of studies have depicted assimilation patterns among adult immigrants in Europe and the US. By and large, the results suggest that even though immigrants' positions improve with years since migration the average immigrant will never catch up with the average native worker (see e.g. Borjas 1999).[1] As described in the next section, the literature

[1] These studies typically assume integration to be a continuous and linear process. But this may not be true for childhood migrants and children of immigrants. According to e.g. Cunha et al (2007), investments at early ages are particularly important since they influence also later investments ("skill begets skill"); in other words the integration process in terms of e.g. language acquisition may not be linear. Theory also suggests that time spent in the host country before e.g. entering the

on segregation contains ample evidence that ethnic and immigrant segregation is substantial in all the markets under study here and our purpose is to provide new evidence on the determinants of the individual choices which shape these societal patterns. It should be noted that it has proven difficult to isolate causal effects of segregation on economic outcomes, partly due to methodological difficulties. Furthermore it has been argued that segregation is not necessarily bad unless it prevents immigrants from taking full part in the host-society's economic and political life (e.g. Ghaffar-Kucher 2006). However, given the magnitude of the sorting patterns, providing a better understanding of the underlying processes is an interesting topic in its own right.

We study individuals who were born in 1960–1971 and who immigrated to Sweden before age 15, or whose parents arrived in Sweden 10 years or less before they were born. Although the time period covers some initial cohorts of refugees and family reunification migrants from more distant countries, it precedes the large waves of refugees in the late 1980s and 1990s for which economic integration has proven particularly problematic. The period we study is instead one of substantial labor migration, often from neighboring countries, and the adult migrants of the time are typically considered successful in terms of economic assimilation.

Our analysis reveals a substantial impact of age at migration on social integration in early adulthood (at age 31–34). The effects are strong: arriving five years later increases the fraction of immigrants at the workplace and neighborhood by about 2 percentage points each whereas the probability of having an immigrant spouse is increased by 12 percentage points. The impact on outcomes related to the labor market tends to be larger among males, whereas the impact on marriage formation is more pronounced for women. We also show that effects on the probability of finding a spouse from the same region of origin fully drives the estimates for the marriage market, whereas the effects on the residential and workplace markets also are driven by increased exposure to other groups of immigrants. When studying Swedish-born children of migrants we find that the fraction of immigrant neighbors, coworkers, and spouses are lower the more time the parent had spent in Sweden before the child's birth.

The rest of the paper is outlined as follows. Section 2 first gives a general background. Section 3 describes the data and section 4 presents some descriptive statistics. Section 5 describes the empirical setup, section 6 presents the results, and section 7 gives some concluding remarks.

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labor market or making marital decisions may be a factor of importance for social integration. See Zhou (2007) for references to theories on the social assimilation of immigrants.

2 Background

2.1 Age at migration and economic outcomes

Most empirical studies of child and adolescent migrants have focused on the potential importance of age at migration as a determinant on schooling outcomes. This aspect is potentially important, in particular since most schooling systems contain age-related checkpoints; children generally leave compulsory and secondary school at certain ages, and the grades received at these stages are an important determinant of which type of higher education they are able to pursue. Performing at these checkpoints may be difficult for immigrants who arrive late due to language problems or other temporary problems during the first few years after arrival. Failures at the checkpoints may have negative effects that are difficult to repair later in life.

Recent empirical studies support the hypothesis that immigrants who arrive later perform worse at school. Cortes (2006) finds that the test score gaps between first and second generation immigrants narrow the longer the first generation have been in the US. Gonzalez (2003) finds that on average, individuals arriving to the US in early childhood will have more education than those arriving in their teens. This pattern, however, varies across region of origin, with the negative association being stronger for Mexican and European immigrants. Van Ours and Veenman (2006) present similar findings for the Netherlands, showing that the level of education attained is lower for those who has immigrated at higher ages, but that the borderline age varies depending on region of origin.[2] Schaafsma and Sweetman (2001) find an association between entry age and earnings in Canada and point out that the potential role of age at migration has typically been downplayed in studies of earnings assimilation. Bleakley and Chin (2008, 2009) conclude that English proficiency at adulthood declines with age at arrival (more sharply after age 9), which in turn affects educational performance in the second generation (i.e. the children of childhood migrants). In the more recent paper, the authors link age at arrival to social outcomes (e.g. residential segregation and intermarriage) via language skills.

Böhlmark (2008) uses an approach similar to ours and studies the impact of age at immigration on Swedish compulsory school grades. The results show that age at immigration has a strong negative impact on school performance, especially among those arriving at age 9 and older. Cross-section regressions give results quite similar to the family fixed effects

[2] See Kao and Tienda (1995), Riphahn (2001), and Chiswick and DebBurman (2004) for further results.

specifications. In contrast to the substantial differences in early performance, Böhlmark (2009) finds that childhood immigrants tend to recover in terms of long-term educational achievement. However, age at immigration was nevertheless found to have a strong negative effect on male earnings.

While our primary focus is on social integration, there is some considerable value added also for the economic outcome measures relative to Böhlmark (2008, 2009): we study also the importance of parental time in Sweden, measure outcomes at somewhat higher ages (which may be important to capture permanent differences), use family fixed effects for all outcomes, and have a much larger sample. It is also worth noting that we analyze a different wave of immigration, i.e., children of labor immigrants (the samples used in Böhlmark (2008, 2009) consist to a much larger extent of the children of refugees).

2.2 Age at migration and segregation

Despite the vast literature on segregation between immigrants and natives[3] it is striking how little is known about the role of age at migration for the ensuing integration later in life. Here we present a brief discussion on segregation theory and the potential links to age at migration.

Segregation in the social dimensions could be driven by preferences. Minority (or majority) individuals may prefer to live and work with peers, and in the marriage market there is little doubt that cultural factors influence preferences and thereby the choices of partners.[4] While it is certainly hard to determine at which age preferences are formed, it seems reasonable that feelings of belonging to the source country's culture and people may be stronger for those migrating at older ages. Parental preferences may also change with time in the host country and this may in turn influence the preferences of the children. There is a large psychological literature looking at parental influences on marriage decisions (beginning with Freud, see e.g. Freud (1950)). Sociological and economic studies have considered how parental attitudes and behavior affect the labor market outcomes of the offspring and their spouses (Thornton, et al 1983, Fernandez et al 2004). Recent theoretical work also studies the mechanisms behind cultural transmission across generations (Bisin and Verdier 2001), and how this interacts with other influences on identity formation (Saez-Marti and Sjögren 2008).

[3] A description of residential segregation is provided by Iceland et al (2002), whereas Hellerstein and Neumark (2008) discuss workplace segregation, and Qian and Lichter (2001) and Kalmijn (1998) show evidence on intermarriage and homogamy. Corresponding Swedish evidence can be found in Bråmå (2006), Åslund and Skans (2009) and Dribe and Lundh (2008).

[4] When preferences are *against* interacting with a certain minority rather than *for* interacting with peers, discrimination and exclusion occurs. Landlords or employers may consciously deter job-applicants belonging to certain groups. Similarly, parents may try to prevent their children from marrying individuals belonging to specific groups.

At least in the labor market, efficiency is likely to be of some importance. If e.g. a common language makes it is easier to communicate and work together (Lazear 1999, den Butter et al 2004), we would expect some segregation based on region of origin. If there are systematic differences in skills across demographic groups (not necessarily in levels but in fields), workplace segregation is likely to occur. Social networks are important for finding work (Ioannides and Loury, 2004), and to the extent that contacts are more common within groups than across groups, this could explain labor market segregation. Similarly, some studies argue that employers use ethnic networks to reduce the risk in hirings (Bailey and Waldinger 1991). In the residential market, living close to other immigrants or ethnic peers may decrease e.g. transportation costs associated with social life and activities in associations. In the marriage market, it may be considered efficient to share language and background. On this market it is particularly clear that there is no clear line separating efficiency from preferences. This is especially true since marriages may serve purposes harder to define in terms of individual utility; e.g. preserving a group's cultural characteristics (Kalmijn 1998; Bisin and Verdier 2000).

Segregation can also be due to more general social patterns of exclusion and segmentation. Naturally, negative consequences are more likely to occur if segregation is not by choice but by exclusion. Theories of labor market segmentation argue that certain groups are concentrated to unattractive jobs and have poor chances of moving on to better ones because discrimination or lack of suitable networks prevents them from accessing other parts of the labor market. In the residential markets, a similar line of reasoning implies that minority groups may be excluded from parts of the housing market and therefore concentrated to less attractive housing with limited chances of upward mobility. See e.g. Ovadia (2003) for a further discussion on theory and empirical findings.

A topic particularly relevant in a study of minority youth is the formation of oppositional cultures. Some scholars have suggested that minority youths may deliberately resist adaptation of majority behavior and therefore also reject the goal of upward social mobility (see e.g. Fordham and Ogbu 1986). More recently this "acting white" phenomenon has also been brought into economics (Austen-Smith and Fryer 2005). While one could argue that segregated environments could be a breeding-ground for such behavior, Bisin et al (2006) and Fryer and Torelli (2005) report that strong cultural identities are more likely to be observed in mixed neighborhoods compared to more homogeneous environments. Even though it is very hard to establish a causal link between identities and economic outcomes, there is evidence on

an association; Clark and Drinkwater (2007) report that minority individuals with a preference for segregation have lower employment rates than those who prefer integrated areas.

2.3 Segregation and economic outcomes

Even though it is notoriously hard to pin down causal effects, many studies do indeed find a link between segregation and economic outcomes. The relationship between residential segregation and economic outcomes is by far the most studied dimension; Durlauf (2004) and Ellen et al (2002) review the literature. Gullberg (2002) summarizes Swedish evidence. Ihlanfeldt (2006) and Gobillon et al (2007) discuss how residential segregation is related to labor market performance through so-called spatial mismatch, i.e. minorities are negatively affected by living separated from job opportunities. Other studies on the effects of ethnic residential concentration include Cutler and Glaeser (1997) for the US, and Edin et al (2003) for Sweden. The effects of labor market segregation are less well documented. Bayard et al (1999) and Åslund and Skans (2009) report a negative association between workplace segregation and wages. For the marriage market, Meng and Gregory (2005) find that intermarriage affects immigrant earnings assimilation.

3 Data

We base our analysis on population-wide register data from the IFAU database which builds on registers originally collected by Statistics Sweden. The main original sources are a residential register (RTB), a linked employer-employee database (RAMS), and an intergenerational register capturing links between parents and children (Flergenerations-registret) as well as information on marital status from registers in the LOUISE database. All these registers are linked by means of a personal identification number used by all Swedish residents in contacts with employers and government agencies.

The database contains information on all individuals aged 16–65 living in Sweden at some point between 1985 and 2005. For these individuals we can identify region of birth, region of birth of each of the parents, year of immigration,[5] gender, and year of birth. Furthermore, for each year we have information on place of residence, education, earnings, and an exhaustive list of employers (see more below). The intergenerational register also contains an indicator of

[5] We only have access to the last year of immigration during our sample period (1985–2005) and we use, for each individual, the first recorded "last year of immigration", i.e. for most individuals the year recorded in the 1985-file.

each child birth, the identity of the father and the mother, and the order of the child for each parent.

3.1 Data restrictions

Our sample contains all who were born between 1960 and 1971 that either immigrated before age 15 *or* whose parents immigrated 10 years or less before they were born. Thus, we measure age of immigration in the [-10, 14] interval and the included years of immigration span from 1950 to 1985. We concentrate on youths who arrived before age 15 to make sure that none of the subjects have entered the labor market or the marriage market before migrating. We only include cases where none of the parents were born in Sweden[6] and base age at immigration on the year when the mother arrived in order to pin down the timing for children born in Sweden. We define *family fixed effects* using the identity of the mother. We measure outcomes as averages of observations at ages 31–34; using several years to decrease the number of missing values for wages and composition of coworkers.

3.2 Exposure

Our main measure of integration/segregation is immigrant *exposure* defined as the fraction of others (within the neighborhood, the workplace or the marriage) that are foreign-born, i.e. the fraction of neighbours, co-workers and spouses who are immigrants. Note that the individual him-/herself is excluded when calculating the measure to avoid dependence on the size of the unit of interaction (e.g. the size of the workplace).[7] We only calculate how exposed the youths are to individuals actually born outside of Sweden although our sample also includes Sweden-born children with parents who are recent immigrants. The reason is that we lack data on where parents of older individuals were born. Thus, we cannot calculate exposure to (older) "second-generation" immigrants. Although this choice reduces the level of measured exposure, it is unlikely to affect the time patterns we are interested in. For visibility we define exposure in percent rather than fractions.

We use information about the mother's place of birth as a measure of specific origin. We use this information to separately analyze the exposure to immigrants of similar origin ("own group") and immigrants of other origin ("other group"). The underlying information is grouped into 26 regions by Statistics Sweden for confidentiality reasons. The definitions of the regions can be found in the appendix.

[6] Individuals where the mother is foreign-born and father data are missing are also included.
[7] See Åslund and Skans (2008) for a discussion of the use of this measure in comparison to other potential segregation measures, and for references to the vast methodological literature on the measurement of segregation.

3.3 The residential market

When analyzing residential integration we use data derived from the address where each individual is registered on the 31st of December each year. This information is aggregated into neighborhoods referred to as SAMS (Small Area Market Statistics) areas by Statistics Sweden. These neighborhoods are defined so as to cover "homogenous residential areas".[8] In total there are 9,230 SAMS areas in Sweden, which means that approximately 1,000 individuals inhabit the average neighborhood. Our analysis only use data on neighbors aged 16-64.

3.4 The labor market

We use three outcomes directly related to the labor market: (i) immigrant exposure at the workplace (the fraction of co-workers who are foreign-born, again excluding the subject him-/herself); (ii) employment; (iii) wages. The outcome variables are defined and created in the following way. The underlying data come from tax records filed by each firm every year and contain all employment relationships in the country during the year. There is an employer (workplace) indicator and an individual indicator linking this information to the rest of the data set.

In addition to annual earnings (by job), data contain information on the first and last remunerated month. We use this information for two purposes: Firstly, we wish to identify workers who are employed within a workplace at the same time, and therefore only include spells covering November each year. In addition, we calculate a measure of wages by dividing the annual earnings from a given employer by the length of the employment spell (within the year). We only keep those individuals whose wages are at least 25 percent of the average janitor wage in order to get a reasonable estimate of wages.[9] For each individual we only keep the observation giving the highest wage within each year. Employment is defined as fulfilling these criteria, and wages are analyzed conditional on employment.

Co-workers are others employed at the same workplace according to the definition above. The workplace exposure sample is further restricted compared to the wage sample, since individuals employed at workplaces with only one employee, as well as those lacking a stationary workplace (artists, freelance employees, employees doing services at other people's

[8] The concept of "homogeneity" does not take into account the ethnicity of the residents.

[9] Skans et al (2009) use a similar procedure and show that the ensuing wage distribution is very similar to the actual distribution of monthly wages. The information on janitor wages are drawn from various publications by Statistics Sweden, detailed information is available upon request.

homes etc) do not have any co-workers by definition.[10] This reduces the sample by approximately 10 percent.

3.5 The marriage market

We measure exposure at the "marriage" market by whether the subject's spouse is foreign-born or native. Similarly to the analysis of wages and workplace exposure, we cannot measure marriage market exposure for those without a spouse. An individual's spouse is defined using the following hierarchical criteria: (i) the partner in marriage if married; (ii) the cohabiting spouse if not married but cohabiting with common children; (iii) the other parent of one's first child if living alone but having a child. Somewhat more than half (a quarter of) the sample is classified through the first (second) criterion.

3.6 Education

Our information about education is based on register data on the highest achieved level of education. This data is collected from Swedish schools and colleges at all levels in the education system. We impute years of schooling based on this information (the values for assigning years of education are available on request).

4 Description

Here we present a general description of the population under study. Table B 1 in the appendix gives some descriptive statistics on the sibling sample. The average years of parental schooling is below 10,[11] which highlights the fact that the included individuals are to a large extent part of great wave of relatively low-qualified labor migrants who came to Sweden from the late 1950s to the early 1970s. This is also evident in the source country composition. Nordic migrants make up 60 percent of the sample, and within this group Finland constitutes 85 percent. Yugoslavia, Turkey, Germany and "Southern Europe" (i.e. Italy and Greece to a large extent) are other groups of significant size. It is thus worth noting that the sampling frame precedes the major flows from the Middle East beginning in the mid 1980s.

4.1 Is there segregation?

A natural starting point is to ask to what extent there is segregation in the studied markets. Table 1 shows data for four populations: Natives with native parents, natives with foreign-

[10] The workplace indicators are defined from physical addresses of where people do the major part of their work.
[11] The fraction with missing information on parental education is high, but less of a concern given that the baseline analysis employs family fixed effects and does thus not use parental education as a control variable.

born parents (arriving less than 10 years before birth), immigrants arriving before age 15, and immigrants arriving later. The two intermediate populations together make up our population of interest. All statistics are measured as averages at ages 31–34.

The table is quite informative about the situation for immigrants in Sweden. First, we see that the average level of education among immigrants, and children of immigrants, is similar to that of natives, a fact which is well-known from previous studies. Second, labor market performance is somewhat poorer among natives with foreign-born parents than among other natives, and a lot poorer among the foreign-born. Third, there are large immigrant-native differences in the degree of exposure to immigrants on all three markets. Note that people of different origin would be randomly allocated in all dimensions if immigrant background played no role.

Table 1 Outcomes in different markets and groups (individuals born 1960–1971).

	Used sample			
	Natives with native parents	Natives with foreign-born parents	Immigrated age –14	Immigrated age 15–30
Economic out-comes				
Education (years)	12.17	11.91	11.43	11.83
Employment (%)	79	74	66	46
Log Wage	9.56	9.58	9.45	9.35
Exposure to immigrants (%):				
Workplace	8	14	18	28
Residential	12	17	21	29
Marriage	7	18	39	73
N	1,254,026	32,802	42,855	156,638

Note: Residential exposure is the fraction of neighbors that are foreign-born, workplace exposure is the fraction of co-workers that are foreign-born and Marriage exposure is the fraction of spouses that are foreign-born. For details on definitions, see the data section. Note that those who immigrated after age 15 may have spent substantially shorter time in Sweden at the time of observation.

This means that immigrants and natives would on average be equally exposed to people of immigrant (and native) background unless there is some systematic sorting.[12] Thus, the fact that we see more immigrant exposure among those with an immigrant background is evidence

[12] Note that the size of the average unit does not matter for this argument. The fact that marriages contain fewer individuals than a workplace or a neighborhood is thus not a concern. For example, let there be 10 percent immigrants in a country (and for simplicity think of this fraction as uniform across the age distribution). Then we would expect each person (independent of origin) to pick an immigrant spouse with a 10 percent probability. Likewise he or she would "pick" an immigrant co-worker and an immigrant neighbor respectively with a 10 percent probability. Therefore we would find that both people with

of segregation.[13] The level of segregation is not only strong but also seemingly increasing in age at migration. Those with "foreign background" have more immigrants among their colleagues and neighbors, and do more often marry immigrants.[14] The magnitudes are quite striking: those that immigrated as youths are more than twice as likely (39 percent) to have an immigrant spouse as those born in Sweden with two foreign born parents (18 percent). Compared to natives with two native parents, immigrant youths are more than 5 times as likely to marry an immigrant.

4.2 Correlations between different integration measures

In order to interpret our results, it is important that we understand how the three markets interact. If, for example, the segregation measures for the three social markets are perfectly correlated, it is not meaningful to analyze them separately. Table 2 shows correlations between the outcomes using both raw data and after removing family fixed effects. All statistics are based on the sample of siblings whose families arrived when they were aged –10 to 14, i.e. the sample that will be used in the empirical analysis below.

We find a negative correlation between economic outcomes and the social integration measures. Youths with more immigrants neighbors, coworkers and spouses have poorer economic and educational outcomes on average. This association is partly, but not fully, explained by the family fixed effects (lower panel).

Interestingly, we find relatively modest correlations between the measures of residential exposure, workplace exposure, and marriage market exposure. The correlation coefficients are in the order of 0.3 and within families (i.e. the variation primarily used in the empirical analysis) it is less than 0.2 in all cases. In other words, people may be much more integrated in one dimension than in another.

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and without an immigrant background have (on average) 10 percent immigrants among their spouses, co-workers and neighbors.

[13] See Åslund and Skans (2008) for a further discussion on comparisons between random and actual allocation distributions in a similar setting.

[14] Note that the extremely high rate of mating with immigrants among those arriving after age 15 is likely to be driven by couples arriving together.

Table 2 The correlation between the outcome measures.

	Overall correlations					
	Ed	Em	Wa	W	R	M
Economic out-comes						
Education (Ed)	1	--	--	--	--	--
Empl. (Em)	0.09	1	--	--	--	--
Log Wage (Wa)	0.24	n.a.	1	--	--	--
Exposure						
Workplace(W)	–0.16	n.a.	–0.14	1	--	--
Residential (R)	–0.15	–0.11	–0.08	0.34	1	--
Marriage (M)	–0.10	–0.10	–0.12	0.29	0.39	1

	Within-family correlations					
	Ed	Em	Wa	W	R	M
Economic out-comes						
Education (Ed)	1	--	--	--	--	--
Empl. (Em)	0.08	1	--	--	--	--
Log Wage (Wa)	0.13	n.a.	1	--	--	--
Exposure						
Workplace(W)	–0.09	n.a.	–0.09	1	--	--
Residential (R)	–0.06	–0.09	–0.04	0.14	1	--
Marriage (M)	–0.02	–0.10	–0.08	0.12	0.18	1

Note: Data are for immigrants with two foreign born parents with siblings in the data. Samples sizes (available upon request) differ since the correlations are based on pair-wise comparisons of all pairs where we have data on both indicators.

5 The empirical setup

Here we set up an empirical model for estimating the impact of age at migration on outcomes at adulthood measured at a fixed age (in our case the early 30s). We define individual *i*:s age at migration as the family's (*j*) year of arrival (*C*) minus the year of birth. As explained in the data section we use data where the family arrived between 10 years before and 14 years after the birth. Thus:

$$Age^{Im} \equiv \text{Year of arrival}\,(C_j) - \text{Year of birth} \in [-10,14] \qquad (1)$$

To study the impact of age at migration it is useful to think of the following conceptual model:

$$y_{ij(i)} = \beta \ Age_i^{\mathrm{Im}} + \delta_t T_i^{Outcome} + \gamma_c C_j^{Arrival} + u_{ij(i)} \qquad (2)$$

where $y_{ij(i)}$ is the outcome of individual *i* belonging to family *j*. The outcome depends on a dummy variable for each possible age at migration (*Age*) except age 0 which serves as a reference point. β is the corresponding vector of parameters, one for each age at migration. The model also accounts for effects from the calendar year of immigration *C* and the year of observation *T*. Retrieving consistent estimates of the β:s poses two challenges. First, as standard in the literature (see e.g. Borjas, 1999), we face a perfect linear dependency between age, cohort, and observation year.[15] Second, we need to deal with the impact of potentially important unobserved heterogeneity. OLS-estimates will confuse the impact of age at migration with an effect coming directly from the parents if e.g. parents who are particularly devoted to the success of their children adjust the timing of migration to the "optimal" age of the children. It is plausible that families who arrive with 14-year-old children are fundamentally different from those who arrive with small children, or those who give birth to their children when already in the host country. Similarly, both the timing of when to have children among those who already migrated and return-migration choices may be influenced by the social and economic integration into the host country.[16]

In order to address these problems we first include family-specific fixed effects α_j to handle unobserved heterogeneity. This means that we remove the impact of endogenous in- and out migration as well as effects on the timing of child births as long as these are driven by factors at the family (rather than child) level.[17]

Since year of arrival does not vary within families (by construction), this variable makes *C* superfluous. Thus we can rewrite equation (2) as:

$$y_{ij(i)} = \beta \ Age_i^{\mathrm{Im}} + \delta_t T_i^{Outcome} + \alpha_j + \varepsilon_{ij(i)} \qquad (3)$$

[15] As is seen by replacing Year of birth in equation (1) by Year of outcome (T) minus "Age at outcome" where the latter is fixed by construction. Note though that the problem cannot be solved by looking at multiple outcome years.

[16] One could interpret higher fertility rates after immigration as indicative of selection, although they are commonly seen as a "disruption effect" in the demographic literature. See Mayer and Riphahn (2000) for a general discussion on economic and demographic models and empirical studies of fertility among immigrant women, and Andersson (2004) for Swedish evidence.

Since outcomes are observed at a common age, the variation in age at immigration and time of observation is identical for siblings. This means that when including the family fixed effects, we have a perfect multicollinearity between age at migration and time of observation. A frequently used strategy to deal with this issue in the assimilation literature is to assume that observation time effects are the same for immigrants and natives. This approach is less appealing when studying social segregation (since the time-effects are likely to differ between immigrants and natives) and has also been questioned for economic outcomes by e.g. Barth et al (2004, 2006).

In order to handle the effects of outcome years we instead assume that *differences in unobserved heterogeneity among age-0 migrants across birth cohorts are not systematically related to the age structure of the cohort*. Under this assumption we can derive consistent estimates through the following transformation: First we calculate the average outcome among same-aged immigrants who arrived at age 0 by observation year (and source region). Then we transform the data by deducting this average from the individual outcome. Formally, we deduct:

$$\bar{y}_t\Big|_{Age^{\mathrm{Im}}=0} = \delta_t + \bar{\alpha}_t\Big|_{Age^{\mathrm{Im}}=0} \tag{4}$$

from (3) to get

$$\tilde{y}_{ijt} = \beta \ Age_i^{\mathrm{Im}} + \alpha_j + u_{ijt} \tag{5}$$

where $\tilde{y}_{ijt} = y_{ijt} - \bar{y}_t\Big|_{age=0}$ and $u_{ijt} = \varepsilon_{it} - \bar{\alpha}_t\Big|_{Age^{\mathrm{Im}}=0}$

Equation (5) shows that identification holds as long as the composition (in terms of e.g. the propensity for segregation) of immigrants arriving at age 0 in different cohorts is uncorrelated with age at immigration within families. A sufficient condition for this to hold is that the composition of age 0 immigrants is the same in all cohorts. We believe that this assumption is relatively innocuous relative to the alternatives presented in the existing literature, especially

[17] The first paper to use this strategy to isolate the effects of age at migration was Böhlmark (2008), who studied schooling outcomes. Van den Berg et al (2009) use a similar approach in their study of the relationship between age at migration and height at adulthood. Both of these papers are based on Swedish data.

considering that the between-year differences of equation (4) are identified from individuals who immigrated in the period 1960–1971 when labor migration consistently dominated the migrant inflow to Sweden.

The baseline strategy is thus to estimate (5) explaining the transformed outcome by age at migration in a family fixed effects model. Thus identification of β comes from differences between siblings in their age at the time when their parents immigrated. We augment this specification by including an indicator for whether the subject is a first-born child, and a gender dummy.[18]

To check the robustness of our results we also estimate equation (2) directly but ignore arrival cohort dummies. This model thus explains the outcomes as measured before the transformation and includes observation-time dummies instead of family fixed effects. In this specification we also control for mother's and father's education, mother's region of origin interacted with dummies for observation year, gender and the first-born indicator in order to capture heterogeneity as best we can. The assumptions then are: (i) *that the included covariates capture selection on the timing of migration*; (ii) *that there are no effects of year of immigration conditional on the included covariates*.

We will present models capturing age at migration (years) in two different ways: (i) as dummies; (ii) using a spline function where the impact is assumed to be linear but where the slope is allowed to change at age 0. Specification (i) is more flexible, whereas (ii) gives more precision and facilitates interpretation. We return to this issue below.

6 Results

6.1 Baseline estimates—family fixed effects

Figure 1 shows semi-parametric estimates from the family fixed effects specifications discussed in section 5. We impose no functional form on the pattern of how age at migration affects segregation and economic outcomes. In all cases we use immigration at the year of birth as the baseline. Starting in the upper panel of the figure, we see a tendency towards a negative relationship between age at migration and completed education. However, the standard errors of the flexible specification are large. For employment there appears to be a negative slope among those born outside Sweden (and thus immigrated after age 0), but the

[18] See e.g. Black et al (2005) and Åslund and Grönqvist (2009) for empirical evidence of birth order effects.

estimates are significant only after age 6–7. The wage specification exhibits no significant impact from age at migration.

The slopes change when we turn to the social segregation measures in the second row of the figure. Workplace, neighborhood and marriage exposure all increase with age at migration. The relationship is particularly strong among the foreign-born, but also appears to be present among those born in Sweden. This suggests that there is inheritance in the integration process; the "capital" (broadly defined) acquired by parents before the child is born seems to reduce segregation among their children.

Figure 1 The relationship between age at migration and outcomes – semiparametric estimates

Notes: Estimates and 95% confidence intervals from family fixed effects specifications described in section 2.3. The employment probability and workplace, residential and marriage exposure are measured at the scale 0 to 100. Education is years of schooling. Wage is 100 times log(monthly wage).

In order to gain precision we have estimated a more restrictive model presented in Table 3. Since the relationships in Figure 1 appear very close to linear in the pre-birth and post-birth intervals respectively we define a functional form with two separate linear segments divided by a spline at age 0. It is not obvious that the slope actually changes at age 0 in all specifications and Table 3 therefore also reports P-values from tests of the equivalence of pre- and post-birth slope parameters.

The table shows that there are statistically significant relationships between age at migration for the foreign-born for all outcomes except wages. The estimates for education are moderate; arriving 10 years later decreases expected education by 0.2 years. This is a small effect compared to results found in e.g. van Ours and Veenman (2006) but in the vicinity of previous Swedish evidence presented in Böhlmark (2009). Interestingly, we find similar effects for children born in Sweden depending on how long the parents have resided in Sweden, suggesting that parental integration is an important channel for furthering educational attainment among immigrant youths.

Increasing age at arrival by 10 years gives 6 percentage points lower employment probability among the foreign-born, which is an impact of economic significance. There is, however, no effect of parental time in the host country, and there is no evidence of wage effects in either interval.

The estimated effects on the exposure measures are all substantial. An individual arriving 10 years later have about 4 percentage points higher share of immigrants at the workplace as well as in the neighborhood. Compared to the sample means of 16 and 19 percent respectively, this is a large impact. The marriage market effects are even larger: arriving at age 10 instead of age 0 almost doubles the probability of marrying an immigrant instead of a native. Interestingly, this means that the within-family differences depending on age at migration are in the order of the descriptive differences presented in Table 1 above.

We have also investigated the "participation effects" in the marriage market from age at migration; arriving 1 year later increases the probability of having a spouse by about 1 percentage point, which should be related to the average marriage rate of 31 percent.[19] This means that the absolute number of marriages between immigrants increases even more with immigration age than what is revealed by the estimates shown in Table 3.

[19] The corresponding coefficients (standard errors) on the probability to be married are 0.92 (0.19) for AM (–10,0) and 1.21 (0.15) for AM (0,14).

The estimated effects of family time spent in the host country before birth for children of immigrants are highly significant for all the social segregation outcomes. The size of the estimates is about half that of the estimates for time spent in the country by childhood immigrants. The p-values for a test of slope coefficients being the same for child migrants and children of immigrants reject the null for all three outcomes. Thus, taken at face value the results suggest that roughly half of the integration due to earlier age at migration is an effect of parental integration and half is due to individual experiences.

Table 3 The impact of one year higher age at migration.

	EDU	EMP	WAGE	WORK	RESID	MARR
AM (0,14)	–.019**	–0.593**	–.003	.495**	.416**	2.382**
	(.006)	(0.135)	(.002)	(.082)	(.047)	(0.175)
AM (–10,0)	–.021**	–0.214	–.002	.235**	.201**	0.961**
	(.007)	(0.155)	(.002)	(.076)	(.046)	(0.206)
Observations	47,625	47,890	36,753	32,696	47,890	29,685
R-squared	.64	.52	.57	.59	.68	0.61
Same slope (p-val)	.840	.045	.897	.011	.000	0.000
Family fixed effects	19,997	20,096	15,891	14,303	20,096	12,760
Df	27,624	27,790	20,858	18,389	27,790	16921
Mean Dep Var	11.52	69	9.50	16	19	31

Notes: Estimates from sibling regressions including family fixed effects; see 2.3 for further description. AM (–10,0) and AM (0,14) indicate the coefficients on age at migration in the respective intervals. "EDU" is imputed years of schooling; "EMP" is employment; "WAGE" is log(monthly wage); "WORK", "RESID" and "MARR" are immigrant exposure in the workplace, residential and marriage markets. The employment probability and workplace, residential and marriage exposure are measured at the scale 0 to 100. The outcome variables are described and defined in section 3. * (**) Statistically significant at the 5(1) percent level.

6.2 Alternative specifications

As discussed in section 2.3 an alternative way of approaching the methodological problems is to parameterize the effects of family background (i.e. to control for e.g. parental education and country of origin) instead of using family fixed effects. This specification provides the opportunity to control for observation year effects directly, provided that one is willing to assume that conditional on the included covariates and observation year, there is no bias due to a correlation between age at migration and unobserved background characteristics and/or immigration year.

Figure B 1 and Table B 2 in Appendix B present results based on this alternative approach. The results correspond to those in Figure 1 and Table 3. We see first of all that the OLS estimates for the sibling sample are very similar to those of the full sample which we interpret as the sibling sample being representative for immigrant youth in general. It is also evident

that the (0,14) coefficients are reasonably similar to the family fixed effects estimates presented in Table 3. However, the estimated exposure effects are much smaller (and insignificant for residential segregation) in the (-10,0) interval when family fixed effects are left out. This suggest that parents who are more "prone" to segregation on average spend a longer time in the host country before giving birth. It is reasonable that parents who have a (sometimes never realized) wish to return the country of origin wait longer before giving birth and have stronger preferences for living with other immigrants. If children inherit these preferences from their parents we would expect a bias in the observed direction. Another alternative is that people do not have children until their economic situation is sufficiently stable. If a tendency to live and work with immigrants is correlated with (or caused by) labor market potential, we would also see this pattern. Furthermore, the family fixed effects capture immigration cohort effects which might also bias the OLS results.

We have also experimented with further alternatives for controlling for observation time effects in the sibling segregation analysis.[20] Controlling for the pool of countrymen gives similar patterns for workplace and residential exposure, and including controls for the number of other-sex countrymen does not alter the patterns for the marriage results. All results are also robust to including only siblings who are born not more than five years apart.

6.3 Heterogeneous effects and variations

Table 4 displays estimates from sibling models where the effects of age at migration are allowed to vary between men and women. The results suggest that labor market integration among foreign-born males is substantially more affected by age at migration than what is the case for the female counterparts. We find a significant negative wage effect for males. The differences between men and women in effects in the (0,14) interval on employment, wages and workplace exposure are all statistically significant.

[20] It is worth noting that using the standard approach from the assimilation literature where native outcomes are used to handle calendar time effects is not appropriate in our setting. For example, birth cohort differences (1960–71) in education are not as strong in the immigrant sample as they are among same-aged natives. This means that had we used the overall trend in education to correct for observation time differences, we would have underestimated the effect of age at migration (since older siblings perform better relative to natives than do younger siblings).

Table 4 Heterogeneous effects: gender

	EDU	EMP	WAGE	WORK	RESID	MARR
Men AM (0,14)	–.015*	–.705**	–.009**	.647**	.450**	2.470**
	(.006)	(.147)	(.002)	(.092)	(.051)	(.193)
Men AM (–10,0)	–.016+	–.366*	–.002	.238**	.197**	.604*
	(.008)	(.178)	(.002)	(.088)	(.053)	(.243)
Women AM (0,14)	–.023**	–.472**	.004*	.327**	.380**	2.304**
	(.006)	(.150)	(.002)	(.091)	(.052)	(.190)
Women AM (–10,0)	–.025**	–.046	–.003	.222*	.205**	1.291**
	(.009)	(.189)	(.002)	(.091)	(.054)	(.245)
Observations	47,625	47,890	36,753	32,696	47,890	29,685
R–squared	.64	.52	.58	.60	.68	.61
P(same slope for men)	.871	.139	.022	.001	.001	.000
P(same slope for women)	.861	.078	.029	.417	.018	.001
P(same slope for women and men in AM (0,14) interval)	.108	.061	.000	.000	.106	.291
P(same slope for women and men in AM (-10,0) interval)	.332	.105	.725	.871	.886	.009
Family fixed effects	19,997	20,096	15,891	14,303	20,096	12,760
Df	27,622	27,788	20,856	18,387	27,788	16,919
Mean Dep Var, Men	11.43	73	9.65	17	20	26
Mean Dep Var, Women	11.61	65	9.33	15	19	34

Notes: Estimates from sibling regressions including family fixed effects; see 2.3 for further description. AM (–10,0) and AM (0,14) indicate the coefficients on age at migration in the respective intervals. "EDU" is imputed years of schooling; "EMP" is employment; "WAGE" is log(monthly wage); "WORK", "RESID" and "MARR" are immigrant exposure in the workplace, residential and marriage markets. The employment probability and workplace, residential and marriage exposure are measured at the scale 0 to 100. The outcome variables are described and defined in section 3. * (**) Statistically significant at the 5(1) percent level.

For marriages, the estimates indicate that parental time in the host country is more influential on the daughters' choice of spouse. Interestingly, the effects are nearly identical for children who migrated themselves. This suggest that the parental influence is larger for females, whereas the impact of own time in the country is larger for males. The latter could possibly be explained by the poorer economic performance among males who arrive late.

It is well known from previous research that labor market performance and social segregation vary heavily depending on region of origin. People of Nordic descent tend to manage best in the Swedish labor market, followed by other Western migrants, whereas Non-Westerners experience the biggest difficulties. This does not necessarily mean that the effects of age at migration are larger in the latter groups. Allowing the effects to vary by region of origin, reveals that the impact on employment and wages is relatively similar across groups,

whereas the negative effect on education is driven by Nordic migrants. The effects on the measures of immigrant exposure are present for all groups at all three markets, but more pronounced for the non-western migrants.[21]

A similar exercise suggests that the impact of age at migration is more or less independent of the mother's level of education. Parental education does, however, affect the outcomes directly in the expected direction. The coefficients from the OLS estimates discussed above show that education, employment and wages increase with mother's and father's education, whereas the direction is the opposite for the three exposure outcomes (i.e. segregation decreases with parental education and wages). Interestingly, the influence of the mother's and father's education is very similar except for in the marriage specification, where the education of the mother is much more influential (i.e. children of educated mothers marry natives more often).[22]

The baseline results suggest that parental integration matters for the integration of the offspring. An interesting question is then to what extent parental segregation at the time of market entry for the subject can explain the differences according to age at migration. Unfortunately we cannot measure residential segregation early on in life for the children. After restricting the number of included cohorts we have experimented with controlling for the parental residential exposure when the child is aged 19 (and 25) but this had very little effect on the results. This suggests that differences in parents' degree of integration when children are relatively old do not influence later child outcomes.

A related issue is the possibility that the impact on social integration is channeled through economic outcomes and/or education, which of course requires that the processes at the different markets are sequential rather than simultaneous. The results reported above give little support to this idea since we find comparatively small effects on economic outcomes, but large influences on social integration. Estimating the exposure models with controls for individual education, employment and wages confirms this impression; the results change very little.

6.4 Exposure to immigrants from different regions

To better understand the process of integration we separate exposure to immigrants from the same region of origin ("own-group" exposure) from exposure to other foreign-born ("other-

[21] The effects on workplace (residential; marriage) exposure in the 0-14 interval is 0.78 (0.64; 3.1) for migrants with a non-western origin. Detailed results are available upon request.

[22] The impact on marriage exposure is -0.012 for each year of mother's education and -0.007 for each year of father's education. Detailed results are available upon request.

group" exposure). While sorting along ethnic lines between immigrant groups in the residential (Bråmå 2006) and labor (Åslund and Skans 2009) markets are well documented, with the evidence suggesting that ethnic (own-group) sorting is more important on the labor market, there is little prior evidence of marriage market sorting. Our data show that the own-group component is the most prevalent at the marriage market: 19 percent of marriages are with a spouse born in the mother's birth region, whereas 12 percent are with someone from another country outside Sweden. The latter is in fact not very far off from the 7 percent immigrant spouses we found among natives with native parents. Further scrutiny (see Table B 3) reveals cross-country connections that would be expected from linguistic and cultural ties (e.g. "South American"–Chile and "Middle East"–Turkey). But it is also apparent that supply matters, which is evident in the high fraction of marriages to Finns (the largest immigrant group) among other groups.

Table 5 presents estimates of how age at migration affects on own-group and other-group exposure on each of the three markets. In the residential market, age at migration affects both dimensions, but relative to the sample mean the estimates are somewhat larger for own-group exposure. The pattern is very much dominated by effects relative to the own group in terms of workplace exposure, but there are also some effects in terms of exposure to other immigrant groups. Most strikingly however, for marriages we find that the entire effect of age at migration goes through the probability of finding a spouse from the mother's region of birth. Age at migration has no effect at all on the probability of finding a spouse of other immigrant origin.

Table 5 Own-group and other-group exposure: spline estimates

	Other-group exposure			Own-group exposure		
	WORK	RESID	MARR	WORK	RESID	MARR
AM (0,14)	.140*	.315**	–.015	.363**	.135**	2.397**
	(.056)	(.041)	(.136)	(.067)	(.015)	(.167)
AM (-10,0)	.056	.149**	–.001	.185**	.066**	.962**
	(.054)	(.042)	(.152)	(.055)	(.014)	(.160)
Observations	32,637	47,798	29,685	32,637	47,798	29,685
R-squared	.55	.67	.52	.58	.73	.63
P(same slope)	.246	.002	.942	.024	.000	.000
Fam. fixed eff.	14,279	20,060	12,760	14,279	20,060	12,760
Df	18,354	27,734	16,921	18,354	27,734	16,921
Mean dep var	10	15	12	6	4	19

Notes: Estimates from sibling regressions including family fixed effects; see 2.3 for further description. AM (–10,0) and AM (0,14) indicate the coefficients on age at migration in the respective intervals. "Own-group" are people from the mother's country of birth; "Other-group" are other foreign-born. "WORK", "RESID" and "MARR" are immigrant exposure in the workplace, residential and marriage markets. The workplace, residential and marriage exposure are measured at the scale 0 to 100. The outcome variables are described and defined in section 3. * (**) Statistically significant at the 5(1) percent level.

7 Conclusions

This paper concerns the impact of age at migration on social integration and educational and economic outcomes in adulthood. We quantify integration by measuring the characteristics of the people each subject is in contact with at different markets. Using population-wide data, which include family links, allows us to handle methodological problems inherent to most empirical studies of the effects of age at migration.

Our results show that age at migration has a substantial effect on the social integration of immigrant youths. Arriving later increases the probability to live among, work with, and marry foreign-born individuals. These effects are also present for those whose parents arrived to Sweden prior to their birth. Even though we do find employment effects of significance, the conclusion must be that the impact on social integration is larger than the effects on economic outcomes (e.g. wages and education).

The fact that marriage patterns are the outcomes which is most strongly affected by parental time in the host country suggests that the social adaptation and acculturation of parents primarily feed onto the children's outcomes in areas where preferences matter the most.

Interestingly, the effects of age at migration on marriage patterns are similar for males and females who immigrated themselves, but females are much more influenced than males by

their parent's time in the host country before birth when studying those born in Sweden. Since the first of these effects is affected by both individual and family integration, our results suggest that female marriage patterns are relatively more affected by *family* exposure to the host country whereas male marriage patterns are more affected by *individual* exposure to the host country.

We also find that the higher levels of segregation among those arriving at higher ages is primarily driven by increased exposure to countrymen rather than exposure other groups of immigrants. This, again, is particularly true in the marriage market where the entire effect is driven by exposure to immigrants from the mother's region of birth. These results suggest that being older at arrival primarily means preserving ties to the source country and culture, rather than strengthening the ties to the overall immigrant community.

Taken together, the results show that although migrating at a higher age may not be a crucial determinant of long-term economic well-being, it does seem to have a very large influence on the composition of the people the individual will interact with on many different social arenas. This dichotomy appears particularly true for females. Furthermore, we find that children's integration depends on the time spent by the families in the source country before their birth—integration is inherited.

It is in this context worth noting that our study primarily covers children to economically successful labor migrants, where social segregation has not been considered a major problem. The present policy debate focuses on the rapidly growing numbers of children to non-western immigrants, whose economic outcomes are much poorer and where the perceived cultural differences are greater. Our findings suggest that parental influences and early experiences are actually more important determinants of social integration in these groups. In the formerly homogeneous countries which now experience an increasing ethnic diversity, it is thus essential to understand these processes for predicting how the societies will develop.

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Appendix A: Birth regions

Region	Countries included
Sweden	*0-Sweden*
Nordic	*1-Finland*
	2-Denmark
	3-Norway+ Iceland
Western Europe	*4-GB + Ireland*
and North America	*5-Germany*
	6-Mediterr. Europe (Greece + Italy + Spain + Portugal + the Vatican + Monaco + Malta + San Marino)
	7-Other Europe (Andorra + Belgium + France + Liechtenstein + Luxemburg + the Netherlands + Switzerland + Austria)
	8-US + Canada
Eastern Europe	*9-Bosnia-Herzegovina*
	10-Former Yugoslavia (Yugoslavia + Croatia + Macedonia + Slovenia)
	11-Poland
	12-The Baltic states (Estonia + Latvia + Lithuania)
	13-Eastern Europe 1 (Rumania + The former USSR + Bulgaria + Albania)
	14-Eastern Europe 2 (Hungary + The former Czechoslovakia)
The rest of the world	*15-Mexico and Central America*
	16-Chile
	17-Other South America (Argentina + Bolivia + Peru + Colombia + Uruguay + Ecuador + Guyana + Paraguay + Surinam + Venezuela)
	18-African Horn (Ethiopia + Somalia +Sudan + Djibouti),
	19- North Africa + Middle East (Lebanon + Syria + Morocco + Tunisia + Egypt + Algeria + Israel + Palestine + Jordan + South Yemen + Yemen + the United Arab Emirates + Kuwait + Bahrain + Qatar + Saudi Arabia + Cyprus)
	20- Other African (all African countries not included elsewhere)
	21-Iran
	22-Iraq
	23-Turkey
	24-East Asia (Japan + China + Korea + Hong Kong + Taiwan)
	25-Southeast Asia (Vietnam + Thailand + the Philippines + Malaysia + Laos + Burma + Indonesia + Singapore)
	26-Other Asia (Sri Lanka + Bangladesh + India + Afghanistan + Pakistan + Brunei + Bhutan + Kampuchea + the Maldives + Mongolia + Nepal + Oman + Sikkim)
	27-Oceania (Australia + New Zealand etc…)

Appendix B: Descriptive statistics and supplementary estimates

Table B 1 Description of the sibling sample

Variable	Obs	Mean	Std. Dev.	Min	Max
Year of birth	47,890	1965.5	3.216	1960	1971
Immigration year	47,890	1967.2	5.895	1950	1984
Age at migration	47,890	1.742	5.675	-10	14
Female	47,890	.487	.500	0	1
Oldest	47,890	.328	.470	0	1
Mother's schooling	40,279	9.707	2.085	8	19
Father's schooling	31,584	9.889	2.271	8	19
Mother's schooling missing	47,890	.159	.366	0	1
Father's schooling missing	47,890	.340	.473	0	1
Origin:					
Finland	47,890	.561	.496	0	1
Other Nordic	47,890	.094	.292	0	1
Germany	47,890	.037	.189	0	1
Western Europe	47,890	.017	.129	0	1
Turkey	47,890	.053	.225	0	1
Eastern Europe	47,890	.037	.188	0	1
Yugoslavia	47,890	.010	.300	0	1
Southern Europe	47,890	.039	.193	0	1
Rest of the world	47,890	.061	.240	0	1
Outcomes:					
Education	47,625	11.52	1.963	8	19
Employment	47,890	69.3	38.0	0	1
Log Wage	36,753	9.498	.473	7.923	12.023
Workplace	32,696	16.1	18.3	0	100
Residential	47,890	19.5	15.1	0	95.6
Marriage	29,685	30.6	46.1	0	100

Notes: Values are for the sibling sample included in the "Residential" estimations, i.e. the sample with the highest number of observations.

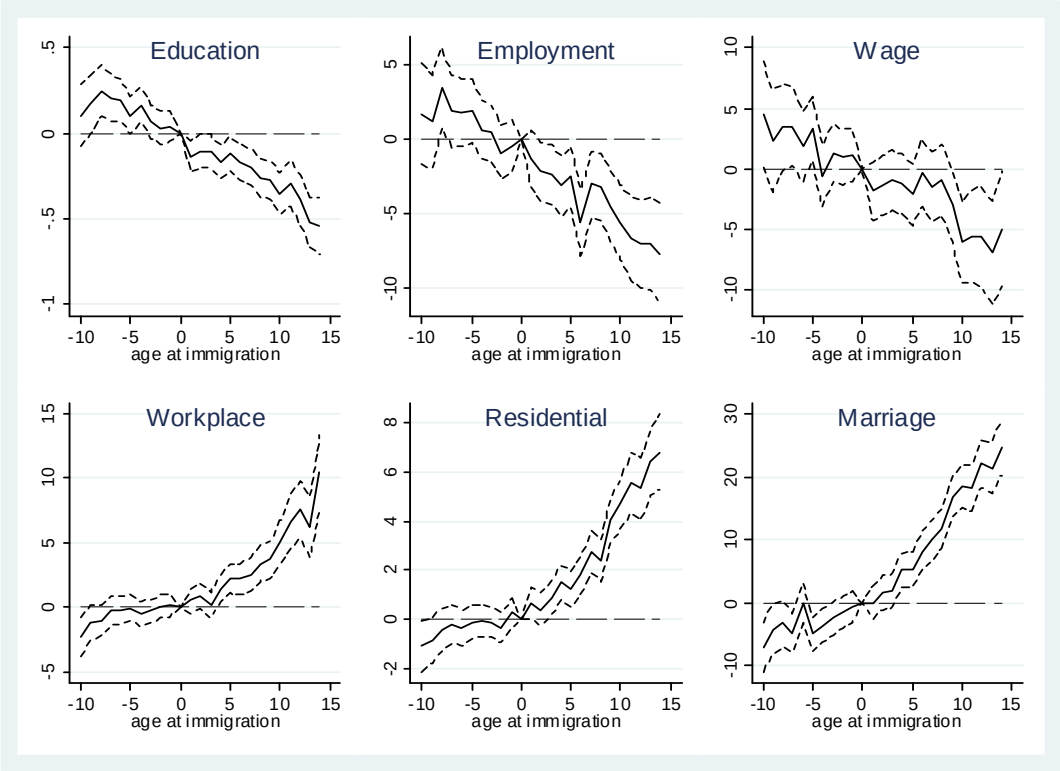

Figure B 1 Semi-parametric OLS-estimates

Notes: Results corresponding to those presented in Figure 1, but estimated using the alternative approach described in section 5.

Table B 2 Linear OLS estimates (cf. Table 3)

	EDU	EMP	WAGE	WORK	RESID	MARR
			Sibling sample			
AM (0,14)	–.035**	–0.474**	–.004**	.515**	.440**	1.801**
	(.003)	(0.063)	(.001)	(.038)	(.024)	(.088)
AM (-10,0)	–.047**	–0.382**	–.006**	.078*	.022	.322**
	(.004)	(0.085)	(.001)	(.039)	(.027)	(.111)
Observations	47,625	47,890	36,753	32,696	47,890	29,685
R-squared	.12	.05	.22	.12	.19	.27
P(same slope)	.060	.570	.386	.000	.000	.000
Df	47,379	47,644	36,508	32,452	47,644	29,437
Mean dep var	11.518	69.3	9.498	16.118	19.489	30.561
			Full sample			
AM (0,14)	–.033**	–0.481**	–.005**	.510**	.418**	1.870**
	(.002)	(0.047)	(.001)	(.027)	(.018)	(.062)
AM (-10,0)	–.045**	–0.302**	–.004**	.040	.036	.259**
	(.003)	(0.066)	(.001)	(.029)	(.020)	(.078)
Observations	74,029	74,335	62,591	58,351	74,334	54,086
R-squared	.12	.05	.22	.11	.17	.23
P(same slope)	.020	.243	.207	.000	.000	.000
Df	73781	74087	62344	58104	74086	53834
Mean dep var	11.648	69.5	9.510	16.149	19.327	29.350

Notes: Cross-sectional estimates (standard errors). Upper panel uses sibling sample (cf Table 3), lower panel includes all individuals in the 1960-71 birth cohorts immigrating in the age interval [–10, 14]. * (**) Statistically significant at the 5(1) percent level.

Table B 3 Cross-ethnic marriage patterns

	Mother's region of birth															
Spouse region of birth	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
(a) Finland	67.2	15.8	19.0	2.1	4.6	17.8	4.0	9.3	9.4	4.5	2.7	1.0	0.5	1.9	0.3	0.5
(b) Denmark	1.5	29.1	3.7	1.4	3.9	6.5	0.8	2.0	3.3	0.2	0.5	0.2	0.1	0.6	0.6	0.5
(c) Norway + Iceland	2.8	6.7	27.2	0.5	1.4	7.9	0.7	0.7	4.9	1.0	1.6	0.2	0.1	1.2		1.0
(d) Fm Yugoslavia	1.8	5.5	3.4	76.1	3.9	5.6	3.5	13.2	8.8	1.2	3.3	0.6	0.1			0.5
(e) Poland	1.1	4.2	3.7	1.2	61.5	5.1	1.4	20.5	3.6	1.2		0.2	0.1	0.6	0.3	
(f) Germany	1.1	1.2	1.9	0.7	1.4	12.1	3.6	1.3	2.6	0.2	1.1		2.2			0.5
(g) Mediterranean Europe	2.2	3.6	3.4	1.6	2.8	7.0	71.2	4.0	3.3	2.4	4.9	0.6	0.6	1.2		0.5
(h) South East Europe	0.7	2.1	0.4	1.3	1.6	1.9	1.7	23.8	3.6	1.4		1.0	0.3	0.6		0.5
(i) Central Eastern Europe	0.6	1.8	1.1	1.3	1.4	3.3	0.8	3.3	37.5	0.4			0.1	0.6		
(j) Chile	2.5	3.3	2.6	0.7	1.6	2.8	1.9	1.3	0.7	65.4	27.3	1.4	0.1	0.6	1.9	
(k) South America	1.5	2.4	4.9	1.1	0.5	2.3	1.1	1.3	2.3	9.7	43.2	0.8	0.2			0.5
(l) M East + N Afr	2.8	2.1	3.4	1.1	1.4	5.1	1.9	4.0	2.9	1.6	1.6	73.2	16.9		0.3	
(m) Turkey	1.0	1.8	1.9	1.7	0.7	0.9	0.9	3.3	1.3	1.0		12.5	76.1	0.6	1.0	3.1
(n) East Asia	0.9	0.6	1.9	0.0	0.7	2.8	0.3		1.0	0.8	0.5	0.2	0.0	52.5	8.4	1.5
(o) SE Asia	2.6	3.9	4.5	0.5	1.1	2.8	0.4	0.7	0.7	1.2		0.6	0.1	22.8	76.0	8.2
(p) Other Asia	0.8	1.5	0.7	0.2	0.5	1.9	0.3	0.7	0.7	0.2	0.5		0.1	2.5	4.5	74.7

Notes: The table shows fractions of marriages with non-natives by mother's region of birth and spouse's birth region. The samples are restricted to regions where we observe at least 100 marriages. To save space, the same restriction is used for spouse's birth region.