



Registration of immigrants' educational attainment in Sweden:

An analysis of sources and time

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Abstract

Swedish register data includes a number of variables related to individuals' educational level. In contrast to many other countries, the register even includes information on the education obtained by immigrants outside of Sweden. For studies on immigrant labor market integration, this is an important asset. However, the quality of data on the highest educational levels of immigrants is less well known. This paper investigates the sources of information for immigrant educational levels and examines the time to registration of education. Employing register data on immigrants who arrived in Sweden in the period of 2000–2016, it shows that the “survey of foreign-born” and the Swedish public employment service are the two major sources of information for immigrant education in the year of arrival. However, the non-response rate from the survey is high and both sources are based on self-reporting. The study applies event history analysis and shows that as the length of stay in the country increases, the share of immigrants with missing educational information notably decreases, especially after two years, with variations among different groups of immigrants. Refugees and family-reunification immigrants, women, and younger immigrants are registered to a higher extent than other groups up to ten years after arrival. Data measured two years after immigration provide a reasonably good coverage of the educational characteristics at the time of migration.

Keywords: Swedish register data; educational registers; missing educational information; immigrant population; lack of registration

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Introduction

Since the 2000s, Sweden has received an unprecedented flow of immigrants; on average 100,000 new immigrants each year (Statistics Sweden, 2018a). Having information on the educational level of this rising immigrant population is crucial for three main reasons.

First, labor market integration is an important aspect for the overall integration of immigrants in Sweden because it provides a source of income and enhances immigrants social capital (Bäckman and Franzén, 2007; Lundborg, 2013). In this regard, education is the primary determinant of an individual's labor market integration (Becker, 1994). However, many studies have evidenced that immigrants, net of their educational level, fare worse in labor markets compared to Swedes with a comparable educational level. Lack of recognition of foreign qualifications as well as transferability issues are the two main reasons underlying immigrants' poor performance in the Swedish labor market (Dahlstedt and Bevelander, 2010; Manhica et al., 2019; Nordlund et al., 2015; Tibajev and Hellgren, 2019).

The recognition and validation of foreign credentials improves an employer's knowledge and certainty about immigrant levels of education and skills, thereby positively affecting immigrant labor market outcomes (Dahlstedt and Bevelander, 2010; Damelang and Abraham, 2016; Tibajev and Hellgren, 2019). Sweden has a free, voluntary validation system for use by all European and non-European immigrants (Damelang and Abraham, 2016; Tibajev and Hellgren, 2019). The recognition process for highly educated immigrants is handled by the Swedish Council for Higher Education (UHR). UHR controls the authenticity of the diplomas, the accreditation of the education provider, and evaluates the field and level of education for the purpose of determining the degree equivalent in the Swedish system. Tibajev and Hellgren (2019) found that immigrants who validated their educational qualifications within the first ten years of residency in Sweden had 4.4 % higher employment rates than those who did not.

As countries have different educational systems, the transferability of foreign qualifications is another barrier to immigrant labor market integration. The pre-immigration educational qualification may not be fully transferable and acknowledged in the host country and, therefore, lose value (see Basilio et al., 2017; Hardoy and Schøne, 2014; Kanas and Van Tubergen, 2009; Nordlund et al., 2015). The foreign educational qualification contains large elements of region-specific skills that are less relevant in the host country, specifically for non-western immigrants (see Basilio et al., 2017). The relevance issues also differ according to immigrant purposes for immigration, and labor immigrants who are selected based on working criteria and have more relevant education and skill do better in the host country labor markets (Aydemir, 2011; Irastorza and Bevelander, 2017). In such studies, immigrant educational attainment is a pivotal determinant to an examination of labor market outcomes and for the identification of difficulties related to immigrant education.

Second, in many cases, pre-immigration education is not fully acknowledged in Sweden (Behtoui, 2004; Duvander, 2001; Nordlund et al., 2015). Immigrants are instead expected to obtain further education in Sweden to enhance their local human capital. Therefore, based on their educational level upon arrival, they attend different levels of studies. To understand and explore the educational trajectory that immigrants follow after arrival, it is important to have the correct information on their educational level upon arrival. Having this information also helps researchers to examine the effects of other factors, such as discrimination, that negatively affect immigrant labor market outcomes regardless of locally obtained education (see Duvander, 2001).

Third, beyond the economic aspect of education, knowledge of immigrant education plays an essential role in evaluating immigrant socioeconomic position upon arrival. Many immigrants, particularly family-reunifying immigrants and refugees, who make up a large share of total immigrants, are neither in the labor market nor in school during the first few years

after arrival (Bevelander and Irastorza, 2014). Thus, their educational attainment upon arrival is a good indicator of their socioeconomic status.

Sweden is one of the European countries with a rich longitudinal register data which contains different educational registers. The highest completed level of education, the field of study, participation in Swedish language courses for immigrants (SFI), enrollment in studies, and type of studies are all collected by the Swedish Educational Registration (UREG). To enhance the quality of educational registers, this educational information for every registered individual is obtained and updated from different sources (Statistics Sweden, 2013; 2016a). The register data is not particular to Swedes and contains information on the education of immigrants obtained outside of Sweden. Such different educational information for individuals in Sweden provides an opportunity for researchers working with register data to examine different aspects of immigrant education as discussed above.

Nevertheless, despite the availability of rich Swedish register data, a recent study by Saarela and Weber (2017) showed that information on the educational level of immigrants prior to immigration, particularly recently arrived immigrants, suffers from a large share of missing information for the year of arrival in Sweden. This is not peculiar to Sweden; in Denmark, information on the highest level of education for immigrants who arrived after 2006 is missing unless they have also obtained education in Denmark (Nielsen et al., 2017). Similarly, in Norway (Jentoft, 2014) and the Netherlands (Linder, 2019), education obtained in other countries is largely missing.

Given this contradictory picture—the existing rich Swedish register data, a large share of missing educational registers among the immigrant population, particularly upon arrival, and the aforementioned importance of information on immigrant education—, I aim in the current paper to use a longitudinal approach to evaluate the quality of the Swedish educational register with respect to the highest completed educational level of international immigrants at the time

of arrival until ten years after arrival in Sweden. In doing so, I address four questions. First, what are the sources of information on immigrant educational attainment in the year of arrival? Second, does the share of missing information on immigrant educational attainment improve with an increased time of residency in Sweden? Third, what are the reasons for the large amount of missing educational information about immigrants in the year of arrival? Fourth, what are the practical recommendations for researchers using Swedish register data on immigrant education?

The organization of this paper is as follows. In section two, the data and the methods are explained. Section three reflects the results and is divided into three parts. In the first part, “Registration of individuals’ educational level in Sweden”, a review and an analysis of the existing reports by Statistics Sweden about the Swedish Educational Register is conducted and the sources and methods for classification and registration of educational information for all registered individuals in Sweden are discussed. In the second part, “An exploration of sources of educational attainment for cohorts of recent immigrants”, Swedish data on the immigrants who arrived in Sweden in the period from 2000–2016 is employed to examine the main sources of immigrant educational information in the year of arrival. In the third part, “An event history analysis of registration of immigrants’ highest educational level”, by focusing on the immigrant cohorts for 2000–2006 and applying a longitudinal approach, the duration of immigrant educational registration from arrival until ten years after arrival as well as the reasons for a large share of missing educational data for immigrant in the year of arrival are examined. The last section discusses the results and concludes with practical recommendations.

Data and methods

Prior to addressing the first question about the sources of immigrant educational attainment, I reviewed and analyzed existing reports on the educational levels of the population in Sweden

(Befolkningens utbildning) and the Swedish Educational Register (Utbildningsregistret), which are published by Statistics of Sweden. These reports entail comprehensive information about the methods for registration of an individual's education, the sources of education, and the educational classification method. Second, I used the population registers to identify the main sources of educational attainment for immigrants arriving in Sweden in the period 2000–2016 who were 18–65 years old at the time of immigration. For these cohorts, I investigated the sources of highest completed education in the year of arrival.

In order to address the second research question, a longitudinal design was used to analyze the timing of the registration of educational attainment for immigrants between the ages of 18–65 at the time of immigration who had no registration of educational level upon arrival. To measure the duration of the time of their educational registration, I used event history analysis (EHA), which contains a variety of statistical techniques to explain the occurrence and timing of events (Allison, 2010). The use of EHA is well-suited to addressing questions of how long it takes until a certain event occurs, in this case, the time to registration of immigrant educational levels.

The data are constructed in person–period format, with a record for each individual in each year. The individuals in the risk set are immigrants with missing educational information in the year of arrival in Sweden. Immigrants for whom educational information is not registered by the end of the observation period (ten years after arrival) are right-censored. As the latest register is for 2016, for this part of the analysis, the population of study is limited to immigrants who entered Sweden in the period 2000–2006 who were then followed from arrival to ten years after arrival.

To answer question three, namely the reasons for the large share of missing educational data for immigrants upon arrival, I addressed the type of registered education. To do this, I examined a variable that measures the year of obtainment of the highest completed education

in the year when immigrant education is registered. If this variable refers to the year before immigration, then the registered education relates to immigrants' origin-education; otherwise, it refers to education obtained in Sweden. This distinction between the types of immigrant registered education reveals the reasons for the registration of education after arrival, and thereby explains the reasons for a large share of immigrants who have missing educational data upon arrival.

I used a collection of longitudinal register data compiled by Statistics Sweden, accessible through Statistics Sweden's system of Micro-Online Access (MONA), which includes geographic, demographic, and socioeconomic registers on the entire Swedish population for the period 1990–2016. Individuals were assigned an anonymized unique ID, which enables the merging of different datasets. The longitudinal integrated database for health insurance and labor market studies (LISA), the longitudinal database for integration studies (STATIV), and the register of the total population (RTB) are the main datasets used in this study. LISA contains socioeconomic information for individuals aged over 15 who are registered in Sweden as of December 31st of each year. The information in LISA is collected from several individual registers (Statistics Sweden, 2016b). For this study, the most important registers in LISA are those obtained from the Swedish Education Register, namely the highest completed level of education (Sun2000niva), the source of educational information (Källkod), and the year of obtaining the highest completed education (ExamAr). The information in the educational register on the field of study (Sun2000Irn) and educational enrollment (StudDelt) was not used in this study.

Information about the reasons for immigration and the country of origin came from STATIV (Statistics Sweden, 2018b). Here, I distinguished between labor immigrants, refugees, students, and family-reunification immigrants. For immigrants who did not need a residence permit, I created three alternatives based on their country of origin: EU immigrants, Nordic

immigrants, and Non-EU immigrants. For Nordic and EU immigrants, the reasons for migration were not registered and such immigrants have the right to work, study, and live in Sweden without needing a residence permit (Swedish Migration Agency, 2020). From RTB, the year of birth, gender, and the year of first immigration were used. Throughout this paper, an immigrant is defined as a foreign-born individual.

Results

Registration of individuals' educational level in Sweden

In the following sections, the existing reports on the educational register for all registered individuals in Sweden are reviewed and analyzed, which provides insight into the registration of education, sources and the classification methods of educational attainment in Sweden. This sets the groundwork for the next section in which I focus on the immigrant population and empirically explore the source of immigrant educational information in the year of arrival and the reasons for the large lack of educational information about the immigrant population upon arrival.

Classification of education

For each registered inhabitant in Sweden, educational level is collected and registered by UREG, the Swedish Education Register (Utbildningsregistret). All information collected by UREG is classified based on a standard category, the so-called SUN classification (Svensk utbildningsnomenklatur), which is in accordance with the international standard classification of education (ISCED). The SUN classification consists of two modules: a level module that shows the highest completed education, starting at primary education for less than nine years (code 1) and continuing to doctorate as the highest level of education (code 7). The orientation module refers to the field of education and consists of three digits. The first digit refers to the

highest level of study and follows the level module, while the second and third digits refer to the field of study. To obtain a SUN code, an individual's education must be complete (Statistics Sweden, 2013; 2018c).

Educational information collected in UREG is updated continuously while and is reported by Statistics Sweden on December 31st of each year. Therefore migrants who arrive early in the year are better covered than those who arrive later months. Table 1 shows the share of missing educational information by the month of arrival in Sweden. Clearly the share of missing educational information is considerably higher for those who arrive later in the year.

Table 1. Share of missing educational information for different cohorts of immigrants aged 18-65 at immigration separated by month of arrival in Sweden, according to UREG measured in the December 31st in the year of arrival

| Cohorts | January/February/ March | | April/May/June | | July/August /September | | October/November /December | | Total | |
|---------|----------------------------|-------|----------------|-------|---------------------------|-------|-------------------------------|-------|-------|-----|
| | N | % | N | % | N | % | N | % | N | % |
| 2000 | 1689 | 12.60 | 1996 | 14.89 | 2942 | 21.94 | 6782 | 50.58 | 13409 | 100 |
| 2001 | 1932 | 13.83 | 2357 | 16.87 | 3101 | 22.20 | 6578 | 47.09 | 13968 | 100 |
| 2002 | 1808 | 12.77 | 2233 | 15.77 | 3307 | 23.36 | 6809 | 48.10 | 14157 | 100 |
| 2003 | 2664 | 16.77 | 2384 | 15.01 | 3854 | 24.26 | 6985 | 43.97 | 15887 | 100 |
| 2004 | 2396 | 15.34 | 2230 | 14.28 | 3550 | 22.73 | 7445 | 47.66 | 15621 | 100 |
| 2005 | 2788 | 14.05 | 2676 | 13.48 | 5149 | 25.94 | 9237 | 46.53 | 19850 | 100 |
| 2006 | 6928 | 20.57 | 5698 | 16.92 | 8753 | 25.99 | 12305 | 36.53 | 33684 | 100 |
| 2007 | 4421 | 14.63 | 4469 | 14.79 | 7644 | 25.30 | 13685 | 45.29 | 30219 | 100 |
| 2008 | 4200 | 13.97 | 5102 | 16.97 | 8797 | 29.26 | 11963 | 39.79 | 30062 | 100 |
| 2009 | 4528 | 14.16 | 5360 | 16.76 | 10473 | 32.75 | 11622 | 36.34 | 31983 | 100 |
| 2010 | 4515 | 15.37 | 4912 | 16.72 | 10023 | 34.12 | 9929 | 33.80 | 29379 | 100 |
| 2011 | 3933 | 15.98 | 4401 | 17.88 | 6654 | 27.03 | 9629 | 39.12 | 24617 | 100 |
| 2012 | 3778 | 15.33 | 4183 | 16.98 | 6351 | 25.78 | 10326 | 41.91 | 24638 | 100 |
| 2013 | 3532 | 13.86 | 4066 | 15.95 | 7056 | 27.68 | 10833 | 42.50 | 25487 | 100 |
| 2014 | 3706 | 14.19 | 4331 | 16.59 | 7826 | 29.97 | 10247 | 39.25 | 26110 | 100 |
| 2015 | 4477 | 15.58 | 4653 | 16.20 | 8305 | 28.91 | 11294 | 39.31 | 28729 | 100 |
| 2016 | 5688 | 14.12 | 6155 | 15.28 | 11782 | 29.26 | 16648 | 41.34 | 40273 | 100 |

Additionally Statistics Sweden (2018c) counts other different reasons that lead to missing educational information for immigrants:

- **Classification of formal education only:** Information collected in UREG is compiled and categorized according to SUN categories which only cover formal education. Any education inconsistent with the SUN classification does not result in registration of education. For instance, apprenticeships, short courses, vocational, and labor market related educational training courses are not approved by SUN. Individuals with similar education are not registered as such in the system.
- **Misclassification:** Information collected via UREG may be coded incorrectly, resulting in a missing value in the SUN classification. However, by enhancing the coding methods and increasing the sources of information acquisition, Statistics Sweden constantly tries to reduce coding errors.
- **No schooling and illiteracy:** The SUN classification begins with primary education; there is no category for no schooling or illiteracy. Consequently, individuals without formal education and illiterate individuals cannot be distinguished from each other, and both have been assigned a missing value in the system. However, illiteracy is not necessarily the same as lack of schooling, and it is possible to learn to read outside of school. As both these groups are assigned the same value (missing), it is not possible to know the extent of illiteracy among the immigrant population and to provide targeted educational supports for them. As recently reported by Swedish Television (2019), the lack of registration of this group is problematic from a policy perspective, as those in charge of immigrant labor market integration cannot distinguish immigrants with some schooling from those who are illiterate.

Sources of registration

UREG collects information about individuals' highest completed educational level from a wide range of sources that have increased over time (Appendix 1). These sources mostly fall into

three categories: population and housing census (Folk-och bostadsräkningen), administrative sources, and a survey of foreign-born.

According to the precision of the information obtained from the different sources, Statistic Sweden has assigned different codes to each source to indicate their quality. The higher the codes are, the qualitatively better the sources. Sources providing 3-digit information on both level and orientation (see “Classification of education” section) have higher quality, while some other sources, especially those which are specific to foreign-born, that give information only on the level model (1-digit information) with no other information are considered as low-quality sources (Karlsson, 2020).

The educational registers are updated annually and if UREG finds multiple education information for an individual, the highest completed education is chosen (Statistics Sweden, 2016a). In case of multiple education on the same level for an individual, the following order is applied to register the individual’s highest educational level (Statistics Sweden, 2013; 2016a; 2016b; Voss, 2019):

1. The most recent year of obtaining the highest completed education
2. Education from qualitatively better sources
3. Highest code for the field of education, that is, codes assigned in the orientation module in the SUN classification.

First, the most recent education is considered. For instance, if an individual has attained two different educations on the same level in the years 2000 and 2005, only the education completed in 2005 is registered in UREG. If all educations are obtained in the same year, the information from qualitatively better sources which provides more reliable and accurate information is used. Finally, when all the aforementioned criteria are similar, education with the highest field of study is used.

An exploration of sources of educational attainment for cohorts of recent immigrants

Obtaining educational information from different sources is done to increase data quality and to reduce missing information. Nevertheless, for immigrants, fewer sources on educational attainment are available as compared to the native population. This section examines the sources of highest completed educational level of recent cohorts of immigrants to Sweden. Table 2 shows the educational attainment of seventeen cohorts of immigrants arriving in the period 2000–2016, with educational attainment measured in the year of arrival. In each cohort, about half have missing educational information upon arrival, with some variation over the years without seeing a clear improvement over time.

Table 2. The educational level of different cohorts of immigrants aged 18-65 at immigration who arrived in Sweden in the period 2000–2016, according to UREG measured in the December 31st in the year of arrival

| Cohorts | Missing educational information | | Primary or lower secondary education | | Upper secondary education | | Tertiary education | | Total | |
|---------|---------------------------------|------|--------------------------------------|------|---------------------------|------|--------------------|------|--------|-----|
| | N | % | N | % | N | % | N | % | N | % |
| 2000 | 13409 | 52.2 | 1833 | 7.1 | 2871 | 11.2 | 7553 | 29.4 | 25666 | 100 |
| 2001 | 13968 | 52.5 | 1951 | 7.3 | 2930 | 11.0 | 7753 | 29.1 | 26602 | 100 |
| 2002 | 14157 | 48.2 | 2562 | 8.7 | 3706 | 12.6 | 8936 | 30.4 | 29361 | 100 |
| 2003 | 15887 | 52.5 | 2553 | 8.4 | 3456 | 11.4 | 8368 | 27.7 | 30264 | 100 |
| 2004 | 15621 | 51.6 | 2294 | 7.6 | 3557 | 11.7 | 8826 | 29.1 | 30298 | 100 |
| 2005 | 19850 | 58.5 | 2073 | 6.1 | 3416 | 10.1 | 8569 | 25.3 | 33908 | 100 |
| 2006 | 33684 | 62.1 | 4670 | 8.6 | 5121 | 9.4 | 10741 | 19.8 | 54216 | 100 |
| 2007 | 30219 | 53.1 | 4914 | 8.6 | 6658 | 11.7 | 15128 | 26.6 | 56919 | 100 |
| 2008 | 30062 | 54.6 | 4106 | 7.5 | 5928 | 10.8 | 14916 | 27.1 | 55012 | 100 |
| 2009 | 31983 | 56.2 | 4670 | 8.2 | 5748 | 10.1 | 14543 | 25.5 | 56944 | 100 |
| 2010 | 29379 | 53.0 | 5887 | 10.6 | 5785 | 10.4 | 14420 | 26.0 | 55471 | 100 |
| 2011 | 24617 | 47.9 | 6541 | 12.7 | 6123 | 11.9 | 14072 | 27.4 | 51353 | 100 |
| 2012 | 24638 | 45.2 | 7609 | 14.0 | 7000 | 12.8 | 15250 | 28.0 | 54497 | 100 |
| 2013 | 25487 | 43.0 | 9488 | 16.0 | 7386 | 12.5 | 16900 | 28.5 | 59261 | 100 |
| 2014 | 26110 | 37.4 | 12328 | 17.7 | 9794 | 14.0 | 21564 | 30.9 | 69796 | 100 |
| 2015 | 28729 | 38.8 | 13330 | 18.0 | 10154 | 13.7 | 21739 | 29.4 | 73952 | 100 |
| 2016 | 40273 | 41.8 | 16854 | 17.5 | 12801 | 13.3 | 26514 | 27.5 | 96442 | 100 |
| Total | 418073 | 48.6 | 103663 | 12.1 | 102434 | 11.9 | 235792 | 27.4 | 859962 | 100 |

Source: Swedish register data, Department of Human Geography, Stockholm University

Using the variable on the source of educational information (Källkod), Figure 1 shows the main sources of information for an immigrant's highest level of education in the year of arrival. Among different available sources for individuals' education (see appendix 1), the so-called survey of foreign-born (Enkät till nyinvandrade utrikes födda) and the Swedish Public Employment Service (Arbetsformedlingen) are the two major sources that provide information about educational levels at the time of arrival for immigrants who acquired an education in a country other than Sweden. The figure shows that the share of information obtained from the survey has decreased over time. Until 2013, the survey of the foreign-born population was the major source, and information obtained from the Swedish Public Employment Service (PES) was very small; particularly in 2000 and 2001 (0.26 and 0.08). Since 2013, PES has become almost equally important as a source for immigrant educational attainment. Swedish for immigrants (SFI) is another source of information, although its contribution to the educational register is very small. In the period 2000–2003, almost 5% of the information about immigrant educational level was obtained from SFI, while in the years 2003–2006, the share of information collected from SFI decreased substantially. From 2007 onwards, with some variations, only a small share of information is collected from SFI. As the survey of foreign-born and PES are considered as qualitatively better sources than SFI (Statistics Sweden, 2013; 2016a; 2016b), SFI is used only for immigrants for whom no educational information is otherwise available.

For immigrants with no information from the aforementioned sources, their educational attainment is obtained from other sources, most often the Swedish Migration Agency (Migrationsverket). Immigrants are not obligated to report their educational level to the Migration Agency (Statistics Sweden, 2013). Thus, information obtained from this source is very limited. In the following, the survey and PES as the main sources of information are discussed.

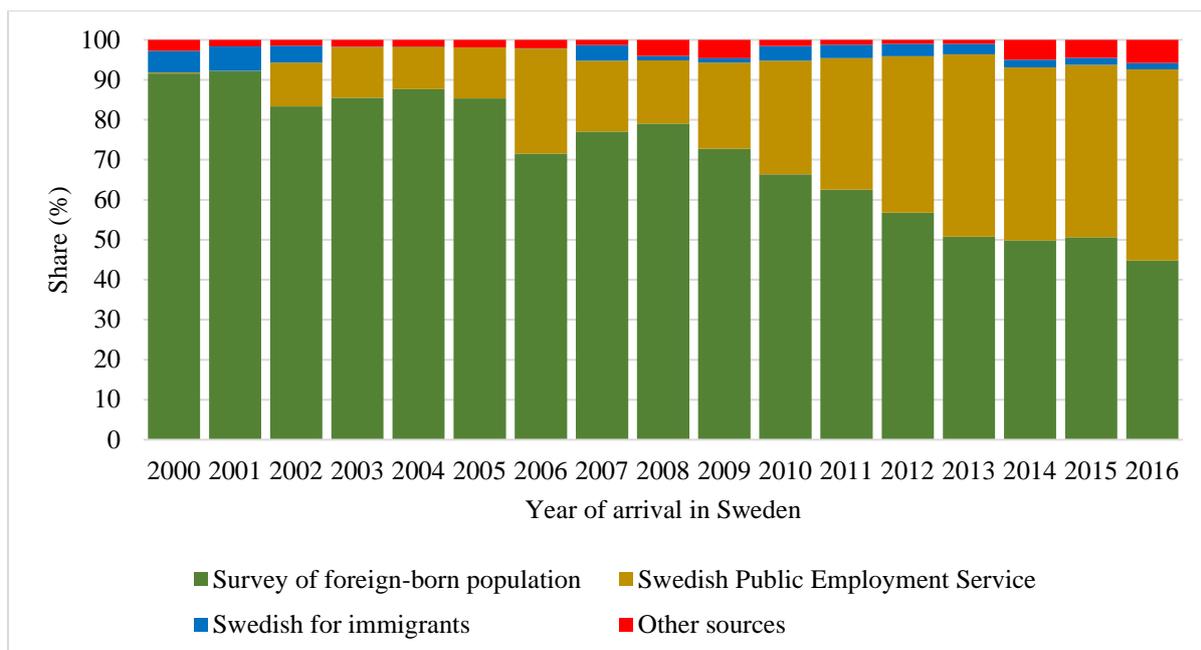


Figure 1. Source of information on educational attainment for immigrants who entered Sweden in the period 2000–2016, according to UREG measured in the Dec 31st in year of arrival. Immigrants with missing values are not included.

Source: Swedish register data, Department of Human Geography, Stockholm University

The Survey of Foreign-Born

For immigrants who acquired their education abroad, the survey of foreign-born is the main source for registration of educational attainment. Since 1999, the survey has been mailed in the first year after arrival to all immigrants aged 20–59, for whom information on educational attainment is missing (Statistics Sweden, 2016a). The questionnaire can be answered either online or by returning it by post (Appendix 2 shows the form including answer categories). The survey consists of five questions:

- Have you received an education in a country other than Sweden?
- How many years in total did you attend compulsory, upper secondary or vocational school in a country other than Sweden?
- How many years did you study at university/college (or receive some other form of post-secondary education) in a country other than Sweden?
- In which year did you receive your highest degree?

- What was your specialization or field of study when you received your highest degree in a country other than Sweden? (Statistics Sweden, 2016c)

To increase the response rate, the questions are asked in a simple way that should be understandable by people with all educational levels, and the survey is available in the most frequently used foreign languages (Statistics Sweden, 2016c). However, the non-response rate from the survey is quite high, especially from EU and Nordic immigrants (Saarela and Weber, 2017; Zander, 2018). Since it is not required to attach any educational certificates to this survey (see Statistics Sweden, 2016c), the information collected through the survey is self-reported. This creates issues regarding the quality of the information. For immigrants without educational information in the registers, the survey is resent every year.

The Swedish Public Employment Service

The second important source to acquire information on immigrant educational attainment is the Swedish Public Employment Service (PES). When immigrants register as job seekers in PES, information about their educational level is often registered and sent to the educational register. In addition, PES provides courses to enhance immigrants' labor market entrance and, during such courses, immigrant educational level may also be registered. For immigrants who do not complete the survey, educational attainment is obtained from PES. Except for some regulated professions, for instance, medicine and healthcare, which by law require formal recognition of education, immigrants in general, are not required to attach their certified validated educational document as proof of what they report in PES (see Swedish Public Employment Service, 2019a). Thus, similar to the survey, educational attainment obtained by PES is self-reported in most cases.

An event history analysis of registration of immigrants' highest educational level

In this section, I analyze whether and to what extent the share of missing information on immigrant educational attainment improves with increasing time in Sweden. The analysis is based on seven cohorts of immigrants that arrived in Sweden in the period 2000–2006 and were then followed for ten years. I only included immigrants with missing education in the year of arrival in the analyses. As the immigrant population is a heterogeneous group, analyses are conducted separately for age at time of immigration, gender, and mode of legal entry.

Table 3 shows descriptive statistics on the group of immigrants. More than half of these recent immigrants had missing educational information upon their arrival. The share of immigrants with missing educational attainment varies by immigrant mode of legal entry, gender, and age at immigration. The share of missing education is higher for men than for women and is higher for immigrants aged 18–25 and 55–65 compared to other age groups. Missing education is most common among students and immigrants who do not need a residence permit.

For the 126576 individuals for whom information on educational attainment was missing, an event history analysis was conducted to measure the duration until educational level was registered, if at all, for the period from arrival until ten years after arrival. Those who emigrated, died, or who did not have their education registered by the end of the observation period were right-censored.

In order to determine when the educational attainment was registered, a survival function was estimated that measured the probability of survival, that is, immigrants not having their educational level registered. Figure 2 shows the Kaplan-Meier survival function which measured the exact time of educational registration. Fifty-five percent of immigrants were registered after one year, increasing to 73% after two years. Beyond two years, the survival rate gradually declined, reaching a share of 97% registered after ten years.

Table 3. Descriptive statistics on the educational attainment of immigrants aged 18-65 at immigration who arrived in Sweden in the period 2000–2006, according to UREG measured in the December 31st in the year of arrival

| | Missing educational information | | Primary or lower secondary education | | Upper secondary education | | Tertiary education | | Total | |
|----------------------------|---------------------------------|------|--------------------------------------|------|---------------------------|------|--------------------|------|--------|-----|
| | N | % | N | % | N | % | N | % | N | % |
| Year of arrival | | | | | | | | | | |
| 2000 | 13409 | 52.2 | 1833 | 7.1 | 2871 | 11.2 | 7553 | 29.4 | 25666 | 100 |
| 2001 | 13968 | 52.5 | 1951 | 7.3 | 2930 | 11.0 | 7753 | 29.1 | 26602 | 100 |
| 2002 | 14157 | 48.2 | 2562 | 8.7 | 3706 | 12.6 | 8936 | 30.4 | 29361 | 100 |
| 2003 | 15887 | 52.5 | 2553 | 8.4 | 3456 | 11.4 | 8368 | 27.7 | 30264 | 100 |
| 2004 | 15621 | 51.6 | 2294 | 7.6 | 3557 | 11.7 | 8826 | 29.1 | 30298 | 100 |
| 2005 | 19850 | 58.5 | 2073 | 6.1 | 3416 | 10.1 | 8569 | 25.3 | 33908 | 100 |
| 2006 | 33684 | 62.1 | 4670 | 8.6 | 5121 | 9.4 | 10741 | 19.8 | 54216 | 100 |
| Total | 126576 | 55.0 | 17936 | 7.8 | 25057 | 10.9 | 60746 | 26.4 | 230315 | 100 |
| Mode of legal entry | | | | | | | | | | |
| Family reunification | 49584 | 50.2 | 9563 | 9.7 | 12999 | 13.2 | 26666 | 27 | 98812 | 100 |
| Refugees | 18836 | 57 | 4235 | 12.8 | 4201 | 12.7 | 5784 | 17.5 | 33056 | 100 |
| Without residence permit | | | | | | | | | | |
| Nordic immigrants | 16460 | 57.3 | 955 | 3.3 | 3146 | 10.9 | 8185 | 28.5 | 28746 | 100 |
| EU immigrants | 5012 | 71.4 | 136 | 1.9 | 533 | 7.6 | 1337 | 19.1 | 7018 | 100 |
| Born outside EU | 2943 | 68.8 | 205 | 4.8 | 283 | 6.6 | 845 | 19.8 | 4276 | 100 |
| Labor immigrants | 12416 | 58.4 | 327 | 1.5 | 1649 | 7.8 | 6881 | 32.3 | 21273 | 100 |
| Students | 10521 | 64.8 | 24 | 0.1 | 137 | 0.8 | 5552 | 34.2 | 16234 | 100 |
| Other reasons | 10804 | 51.7 | 2491 | 11.9 | 2109 | 10.1 | 5496 | 26.3 | 20900 | 100 |
| Total | 126576 | 55.0 | 17936 | 7.8 | 25057 | 10.9 | 60746 | 26.4 | 230315 | 100 |
| Age at immigration | | | | | | | | | | |
| 18-25 | 37710 | 66.8 | 3915 | 6.9 | 6111 | 10.8 | 8687 | 15.4 | 56423 | 100 |
| 25-45 | 72640 | 49 | 12031 | 8.1 | 16760 | 11.3 | 46862 | 31.6 | 148293 | 100 |
| 45-55 | 9712 | 56.4 | 1512 | 8.8 | 1757 | 10.2 | 4232 | 24.6 | 17213 | 100 |
| 55-65 | 6514 | 77.7 | 478 | 5.7 | 429 | 5.1 | 965 | 11.5 | 8386 | 100 |
| Total | 126576 | 55.0 | 17936 | 7.8 | 25057 | 10.9 | 60746 | 26.4 | 230315 | 100 |
| Gender | | | | | | | | | | |
| Men | 64771 | 56.4 | 8442 | 7.3 | 12720 | 11.1 | 28927 | 25.2 | 114860 | 100 |
| Women | 61805 | 53.5 | 9494 | 8.2 | 12337 | 10.7 | 31819 | 27.6 | 115455 | 100 |
| Total | 126576 | 55.0 | 17936 | 7.8 | 25057 | 10.9 | 60746 | 26.4 | 230315 | 100 |

Source: Swedish register data, Department of Human Geography, Stockholm University

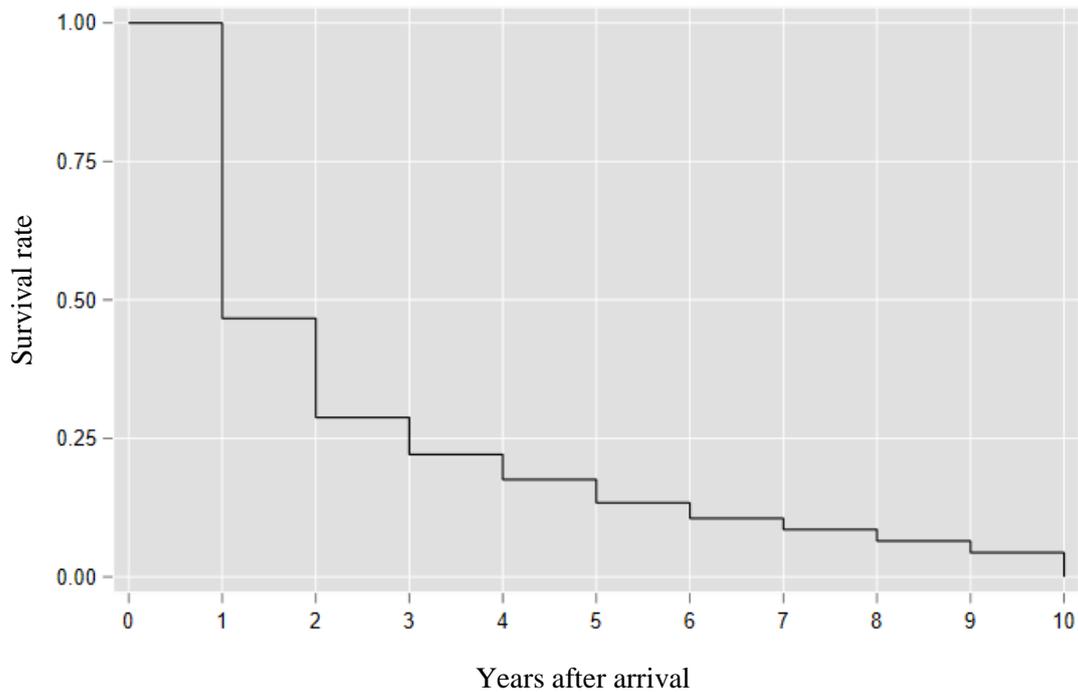


Figure 2. Kaplan-Meier survival function of not being registered in UREG for immigrants who entered Sweden in the period 2000–2006

Source: Swedish register data, Department of Human Geography, Stockholm University

As the descriptive statistics have shown that missing educational information varies by different immigrant groups (Table 3), Figures 3–5 present the results from the event history analyses by different immigrant groups. Figure 3 shows that the survival rate for immigrant men is higher than that for immigrant women in all years after arrival, meaning that women’s educational attainment is more often registered than men’s at all time points. After ten years, the share of immigrant men with missing information is 6%, compared to 3% for women.

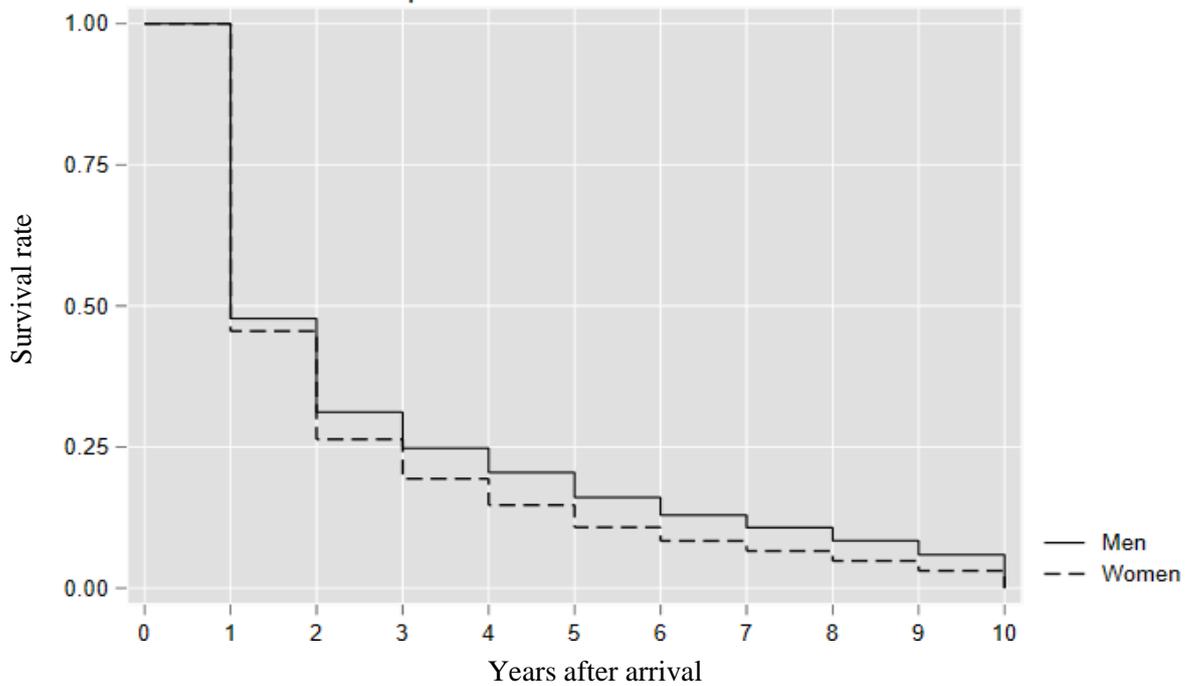


Figure 3. Kaplan-Meier survival of not being registered in UREG for immigrants who entered Sweden in the period 2000–2006, separated by gender

Source: Swedish register data, Department of Human Geography, Stockholm University

Figure 4 presents the duration until registration of education in UREG for immigrant groups by mode of legal entry. Refugees and family-reunification immigrants have the lowest survival rates overall and a small share of them are not registered in UREG after ten years. Refugees and their families may participate in a 24-month introduction program administered since 2010 by PES that includes language training, labor-market services, cultural, and society training. Those who participate in this introduction program are entitled to daily allowances and housing benefits (Emilsson, 2014; Swedish Public Employment Service, 2019b). During the introduction program, many immigrants have their education registered in the first few years after arrival. This may be a reason for the higher registration rate among this immigrant group. On the contrary, Nordic immigrants have the highest survival rate in all of the years and 15% of them remain unregistered in UREG after ten years. One possible explanation is that due to the easier mobility between Sweden and the other Nordic countries (Iceland, Norway, Finland,

and Denmark) where no residence permits are required (Swedish Migration Agency, 2019), these immigrants are not registered in the migration agency which is one source of immigrant educational information. Thus, their survival rate is higher than for other groups.

Regardless of these variations, for all groups of immigrants, we observe a substantial reduction in their survival rate within the first two years, particularly the second year after arrival.

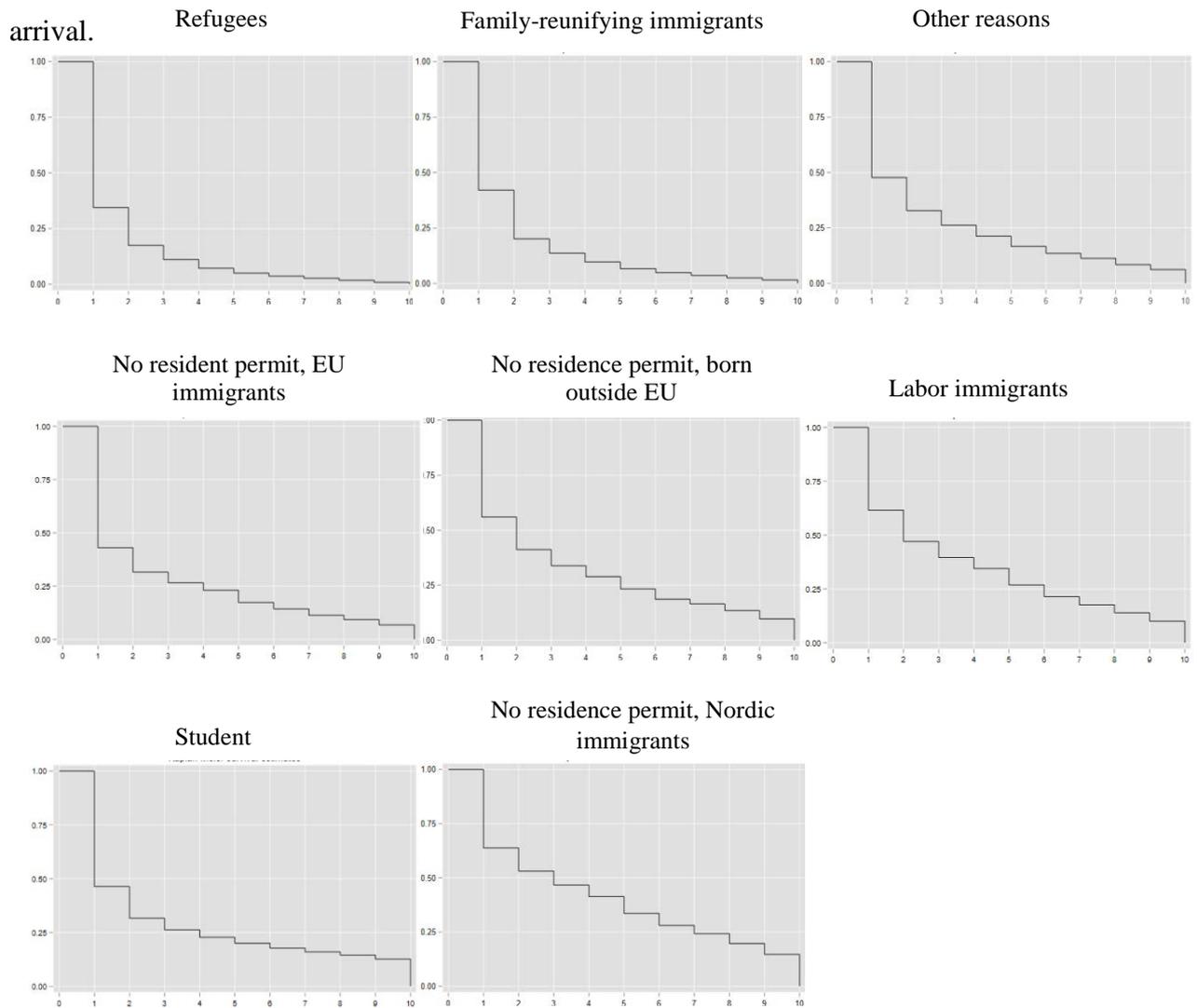


Figure 4. Kaplan-Meier survival of not being registered in UREG for immigrants who entered Sweden in the period 2000–2006 separated by mode of legal entry to Sweden; X and Y axes refer to years after arrival and survival rate respectively

Source: Swedish register data, Department of Human Geography, Stockholm University

Figure 5 shows the oldest immigrants have the highest survival rates compared to other age groups. After two years, about 75% of all other age groups have their educational attainment registered, but a large share of older immigrants, 50%, remains unregistered. Even after ten years, 25% of older immigrants are not registered in UREG. A possible explanation is that immigrants in the labor market ages may have their educational attainment registered through the employment agency, universities, or other educational organizations, while those entering Sweden at older ages may not take up work and therefore do not get registered.

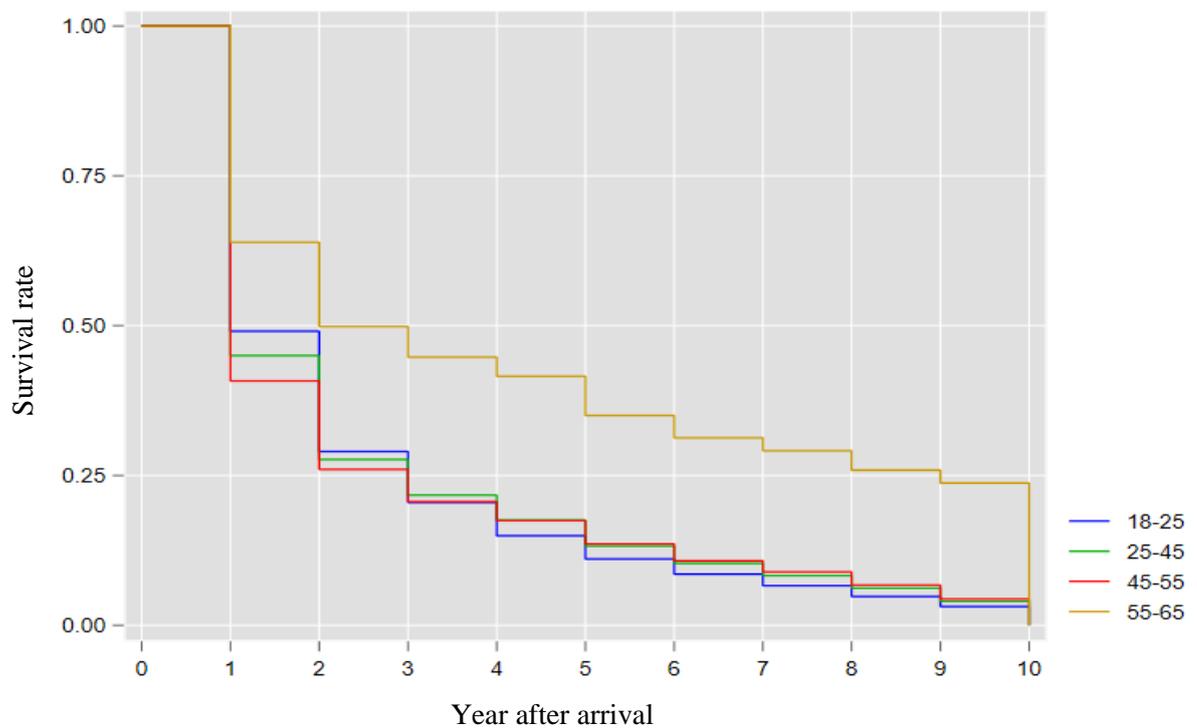


Figure 5. Kaplan-Meier survival of not being registered in UREG for immigrants who entered Sweden in the period 2000–2006, separated by age at immigration

Source: Swedish register data, Department of Human Geography, Stockholm University

The analyses have shown that missing information on educational attainment decreases over time, and that two years after arrival, 75% of immigrants have their education registered. However, part of the registration, particularly several years after arrival, might be due to education obtained in Sweden. To know the reason(s) for the reduction in the missing

educational information after two years, the year of completing the highest level of education (ExamAr) was examined in order to distinguish between education obtained in the country of origin and the country of destination. If the year of examination was prior to the year of immigration, the registered educational level is considered as education obtained in the country of origin. If the year of examination was after arrival, then the registered educational level is regarded as locally obtained education. Given that different groups of immigrants, depending on their purpose for immigration, have different activities, Table 4 presents descriptive statistics on this analysis.

Table 4. Type of registered education measured two years after arrival; pre-immigration or locally obtained education, for immigrants who arrived in Sweden in the period 2000–2006

| | Education obtained in Sweden | | Education obtained prior to immigration | | Total | |
|--|------------------------------|------|---|------|-------|-----|
| | N | % | N | % | N | % |
| Family reunification | 412 | 1.1 | 36073 | 98.9 | 36485 | 100 |
| Refugees | 141 | 1.0 | 14232 | 99.0 | 14373 | 100 |
| No residence permit, Nordic immigrants | 992 | 18.7 | 4315 | 81.3 | 5307 | 100 |
| No residence permit, EU immigrants | 280 | 10.1 | 2483 | 89.9 | 2763 | 100 |
| No residence permit, born outside EU | 118 | 8.4 | 1286 | 91.6 | 1404 | 100 |
| Labor immigrants | 117 | 2.2 | 5122 | 97.8 | 5239 | 100 |
| Student | 4277 | 73.0 | 1578 | 27.0 | 5855 | 100 |
| Other reasons | 364 | 5.9 | 5798 | 94.1 | 6162 | 100 |
| Total | 6651 | 8.6 | 70887 | 91.4 | 77538 | 100 |

Source: Swedish register data, Department of Human Geography, Stockholm University

The overall majority of registered education refers to education obtained prior to moving to Sweden. Only 8.6% of immigrants had obtained education in Sweden two years after arrival. We may conclude that lack of registration is the main reason underlying the large share of immigrants who have missing educational information in the first years of their stay in Sweden. The pattern is similar for all immigrant categories except for students, whose registered education after two years is largely equivalent to that obtained after migration.

Conclusions and discussion

Sweden has a very rich longitudinal dataset that contains information on different aspects of individuals' education, such as the highest completed educational level, the field of study, the year of obtaining an education, enrollment in the study, and type of study. Despite such rich educational registers, educational information for a large number of immigrants, especially at the time of arrival, is missing (Saarela and Weber, 2017). Given that education is a vital determinant of an individual's labor market integration (Becker, 1994) and it is the initial indicator presenting immigrant socioeconomic status upon arrival, I set out to evaluate the quality of the highest educational level register for the immigrant population. My study has answered three questions about the sources of information for immigrant educational levels in the year of arrival, the time to the registration of their education, and the reasons underlying the large amount of missing educational information for immigrants upon arrival. Relying on the following results, I have suggested some practical recommendations for researchers using register data on immigrant education.

First, for all registered individuals in Sweden, their educational information is constantly updated from a variety of sources of different quality (Statistics Sweden, 2013; 2016a; 2016b). I have found that the survey of foreign-born and the Swedish Public Employment Service are the main sources that provide information about immigrant education in the year of arrival. Both sources provide self-reported information on immigrant education (Statistics Sweden, 2016c; Swedish Public Employment Service, 2019a), which raises concerns about the validity of the information. In other words, it questions to what extent the information obtained from these sources indicates a higher or lower level of education than the actual education of immigrants?

Second, based on a longitudinal analysis of seven recent cohorts of immigrants, I have shown that more than half have missing education in the year of their arrival. An event history

analysis of the time to the registration of immigrant education since arrival shows that with increasing time of residency, the share of immigrants with missing educational information reduces significantly. Seventy-three percent of immigrants with missing educational attainment upon arrival have their educational level registered in the second year after arrival. However, this is not similar for all immigrants and it differs by immigrants' age at immigration, gender, and mode of legal entry. Results show that refugees and family-reunifying immigrants, women, and immigrants younger than 55 years at immigration are registered to a higher extent than other groups.

Third, by examining the year of completion of the highest level of education two years after arrival and distinguishing between locally-obtained and pre-immigration education, I have addressed the reason for a large amount of missing information upon arrival and more registration in the second year after arrival. Results reveal that for the majority of all immigrants, excluding students, education had been obtained outside of Sweden. Based on this finding, together with the different reasons that were counted for missing educational information in UREG (see Statistics Sweden, 2018c), I conclude that lack of registration is the main reason for the large share of immigrants with missing educational attainment upon arrival. Since educational information in UREG is reported by Statistics Sweden on December 31st of each year, immigrants who arrive earlier in the year are more covered than those who arrive later and as evidenced, the share of missing information in all cohorts is much higher among the latter group. Given that the registered education two years after immigrant arrival mostly measures pre-immigration education, its pay-off on immigrant outcomes in the labor market in comparison with their Swedish obtained education, if any, can be examined. This will contribute to the discussion about effect of immigrant origin education vs destination education on their labor market outcomes in Sweden (see Behtoui, 2004; Duvander, 2001; Nordlund et al., 2015).

Related to these findings, I close this section with some recommendations for researchers using register data on immigrant educational level. I found that, regardless of variation in the extent of educational registration among immigrant groups, the survival rate for all groups of immigrants is substantially reduced in the second year after arrival. Considering the large number of immigrants with missing educational information in the year of arrival along with the very gradual increase in registration from year two onwards, this study suggests using immigrant educational information two years after arrival instead of in the year of arrival. This has two-fold importance. First, it gives a more realistic picture of the initial socioeconomic status of immigrants. Second, it is a more reliable determinant in immigrant labor market outcomes.

I also recommend not replacing randomly missing education in the year of arrival with any specific educational level. As I evidenced, lack of registration is the main reason for the large share of missing information among immigrants in the year of arrival. Therefore, missing educational information does not imply specific educational levels. The replacement of missing information with a specific educational level is a potential mistake that overestimates or underestimates the actual education of immigrants and yields biased results.

Lastly, regarding the source of immigrant education in the year of arrival, the provision of certified educational qualifications as a supplementary attachment to the survey or in the job search process in addition to reported education is suggested to overcome the issue of self-reporting. Doing so to a large extent can assure the validity of information obtained from these sources, especially since these sources provide a large share of information about immigrant education. This, in turn, contributes to the quality of studies in which immigrant educational level plays a salient role.

There are some limitations to this study that can be addressed in future research. For example, while I have evidenced a large educational registration in the second year after

immigrant arrival, I have not investigated sources of educational information in that year. I discussed thoroughly that the survey of foreign-born and PES are two major sources of immigrant educational information in year of arrival which are self-reporting. Speaking to concerns over the validity of data obtained from these sources, it would be worthwhile to know whether in parallel with more registration in the second year, the sources of information change.

Additionally, I have shown that among different groups, a larger share of Nordic immigrants than other groups remain unregistered after ten years. Further research is needed to explore the reasons underlying a larger amount of missing education information among Nordic immigrants. This is particularly essential for researchers using the educational attainment of Nordic immigrants in their studies.

Abbreviations

UHR: Swedish Council for Higher Education

UREG: Swedish Educational Registration

MONA: Micro-Online Access

EHA: Event history analysis

LISA: Longitudinal integrated database for health insurance and labor market studies

STATIV: Longitudinal database for integration studies

RTB: Register of the total population

SUN: Svensk Utbildningsnomenklatur

SFI: Swedish language courses for immigrants

PES: Swedish Public Employment Service

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Appendixes

Appendix 1

Table 5. Sources of education collected by UREG

| Sources in the Swedish register of education |
|---|
| Register based labor market statistics (1985) |
| Register based labor market statistics (1986) |
| Register based labor market statistics (1987) |
| Register based labor market statistics (1988) |
| Register based labor market statistics (1989) |
| Swedish for Immigrants (SFI) |
| Adult education (KOMVUX) |
| The Swedish Migration Agency, Register of Migration and Asylum statistics |
| The Swedish Public Employment Service |
| Population and housing census 1970 |
| Register of wages (private, municipal, county council and public sector) |
| The Swedish National Board of Student Aid |
| Survey on Income and Living Conditions (until UREG 2006) |
| Labor Force Survey |
| Applicants to tertiary education |
| The survey of foreign-born education |
| Register of teaching personnel |
| Certification from introductory programs (upper secondary education) |
| Study certificate |
| Higher education credit HE (until UREG 1999) |
| Applicants/admitted to upper secondary school |
| Access programs to higher education |
| Labor market training |
| Folk High School, general entry requirements |
| The National Board of Health and Welfare, old register |
| The Swedish Council for Higher Education (UHR), foreign post-secondary education not tertiary education |
| The Swedish Board of Agriculture (registered veterinary) |
| The Swedish National Agency for Education, foreign teacher education |
| The Swedish Armed Forces |
| Register of upper secondary education and post-secondary education not elsewhere collected (EXTAS) |
| Applicants to post graduate education |
| "Various" post-secondary education |
| Compulsory school |
| Upper secondary school, special courses |
| Post-secondary courses in arts and culture |
| Swedish schools abroad (compulsory and upper secondary education) |
| Foundation year program |
| Higher education credit HE (UREG 2000 and onwards) |
| Register of Higher Vocational Education |
| Swedish defense University |
| Register of higher education |
| Register of post-graduate education |
| Individual information |
| Population and housing census 1990 |

Source: Statistics Sweden (2016b)

Appendix 2

| | |
|--|--|
| <p>NOTE: This is a guide. Enter your answers on the Swedish questionnaire or the web.</p> | <p>Education in a country other than Sweden</p> |
| <p>If you complete the survey online you don't have to return the questionnaire. Go to www.scb.se/ual and log in with the user name and password listed at the top of the questionnaire.</p> | |
| <p>1. Have you received an education in a country other than Sweden?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No → Thank you. Please return the questionnaire in the enclosed reply envelope.</p> | |
| <p>2. How many years in total did you attend compulsory, upper secondary or vocational school in a country other than Sweden?</p> <p><i>Please select only one option.</i></p> <p><input type="checkbox"/> 1-8 years</p> <p><input type="checkbox"/> 9 years</p> <p><input type="checkbox"/> 10-11 years</p> <p><input type="checkbox"/> 12 years or more</p> | |
| <p>3. How many years did you study at university/college (or receive some other form of post-secondary education) in a country other than Sweden?</p> <p><i>Please select only one option.</i></p> <p><input type="checkbox"/> No post-secondary education</p> <p><input type="checkbox"/> 1 year</p> <p><input type="checkbox"/> 2 years</p> <p><input type="checkbox"/> 3 years</p> <p><input type="checkbox"/> 4 years or more</p> <p><input type="checkbox"/> Postgraduate degree (equivalent to PhD)</p> | |
| <p>4. In which year did you receive your <u>highest</u> degree?</p> <p style="text-align: center;"> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> </p> | |
| <p>5. What was your specialisation or major field of study when you received your <u>highest</u> degree in a country other than Sweden?</p> <p><i>Please select only one option.</i></p> <p><input type="checkbox"/> General education</p> <p><input type="checkbox"/> Teacher education, teaching methods</p> <p><input type="checkbox"/> Arts</p> <p><input type="checkbox"/> Humanities, languages, religion</p> <p><input type="checkbox"/> Social and behavioural sciences</p> <p><input type="checkbox"/> Law</p> <p><input type="checkbox"/> Economics and business studies</p> <p><input type="checkbox"/> Commerce, administration</p> <p><input type="checkbox"/> Natural science, computing</p> <p><input type="checkbox"/> Engineering and manufacturing (for example architect)</p> <p><input type="checkbox"/> Master of engineering/technology (four years or more of study at university/college)</p> <p><input type="checkbox"/> Agriculture and forestry (for example veterinarian or agronomist)</p> <p><input type="checkbox"/> Health and medical care, social care (for example pharmacist or dispenser)</p> <p><input type="checkbox"/> Doctor</p> <p><input type="checkbox"/> Dentist</p> <p><input type="checkbox"/> Nurse</p> <p><input type="checkbox"/> Services (for example restaurant, tourism, cleaning, police or military)</p> | |
| <p>Please return the questionnaire in the enclosed reply envelope. No postage is needed. Thank you for your cooperation.</p> | |

Figure 6. Sample of questions in the “survey of the foreign-born”

Source: Statistics Sweden (2016c)

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