

**UNITED NATIONS STATISTICAL COMMISSION
and ECONOMIC COMMISSION FOR EUROPE**

**STATISTICAL OFFICE OF THE
EUROPEAN UNION (EUROSTAT)**

Joint Eurostat/UNECE Work Session on Demographic Projections
organised in cooperation with Istat
(29-31 October 2013, Rome, Italy)

Item 4 – Assumptions on future migration

Model to forecast the re-immigration of Swedish-born by background

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Abstract

The immigration and emigration in Statistics Sweden's national population projection is presented and analyzed by seven different birth-groups, of which Swedish-born constitutes one group. For Swedish-born persons, first the emigration is calculated, which then makes it possible to estimate the return immigration.

To estimate the future re-immigration of Swedish-born, a population living abroad is created with information on immigration and emigration. For each year, emigrated Swedish-born have been added to the population that lives abroad and re-migrants been subtracted. When estimating the future re-immigration, we use a linear regression equation. The model is based on rates of return immigration applied on the estimated data on how many Swedish-born that are likely to live abroad in combination with data on the emigration three years earlier.

The model does not consider the background of the Swedish-born living abroad, i.e. their parents country of birth. It's little known about in what extent people with different background re-immigrate. In present model for the future re-immigration all groups have the same risk to return to Sweden. We believe that the rates of return immigration differ depending on the parent's country of birth.

The aim of this study is to further develop the model that predicts the return migration of Swedish-born by adding the parents country of birth on the estimated population living abroad. This makes it possible to calculate rates for return immigration by parents country of birth and may help us to do more accurate projections on migration.

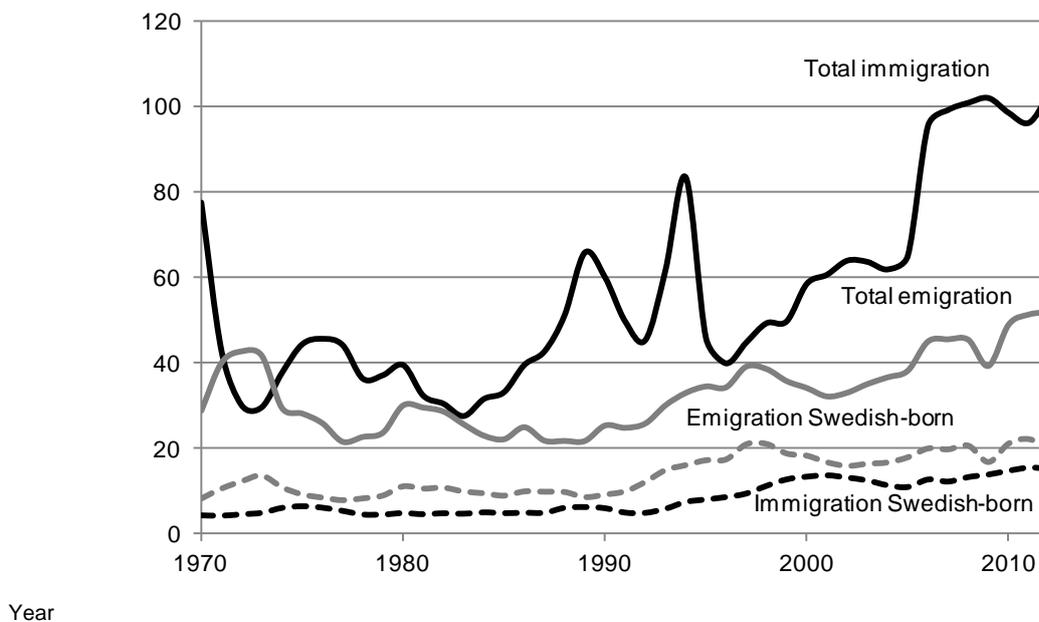
The results shows on different migration behaviors for the three different groups. Swedish-born with two Swedish-born parents have the lowest rate to emigrate and the highest rate for return immigration which leads to a slowly increasing number of emigrants and also an increasing return immigration. Swedish-born with two foreign born parents have the highest propensity to emigrate but doesn't return to Sweden in the same extend as those with two Swedish-born parents. This leads to an increasing population living abroad. However, compared to the national population projection, including parents country of birth doesn't give that large differences in return migration. Therefore it might not be necessary to include this variable in the national population projection.

Background

Fluctuations in immigration and emigration to and from Sweden have been significant in recent decades. Labour migrants, especially from Finland and Yugoslavia, dominated both the immigration and emigration throughout the 1970s. In the 1980s and the 1990s, an increasing number of refugees and asylum seekers migrated to Sweden due to conflicts or political troubles in their home countries and it peaked in 1994 with people seeking protection from the wars of the former Yugoslavia. Emigration increased during the financial crisis in the 1990s and since the turn of the millennium, the migration to and from Sweden has continued to be high. Migration due to labour, refugees, family reunifications and from EU's new member states are some reasons for the latest years high numbers. Another reason is the increasing migration of Swedish-born. The emigration of Swedish-born improved throughout the 1990s during the financial crisis and even if it decreased some during the first half of the 21st century, it is still on a relative high level with about 20 000 Swedish-born emigrants each year. The number of emigrants in 2012 were the highest ever with about 51 700 persons and of which Swedish-born constituted about 40 percent.

Figure 1. Immigration and emigration, total and for Swedish-born 1970-2012.

Thousands

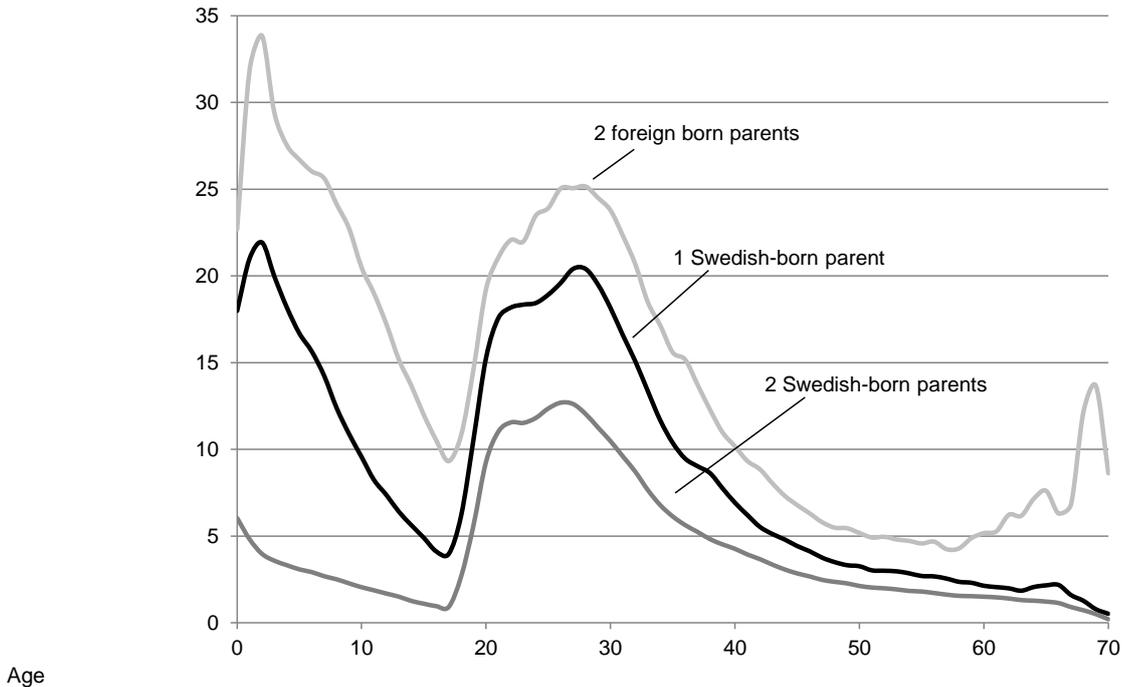


Statistics Sweden do annual national population projections based on analysis on births, deaths and immigration and emigration by seven different birth country groups were Swedish-born are one. For Swedish-born, first the future emigration is projected which makes it possible to estimate the return immigration.

The number of people who emigrates are estimated by age- and sex-specific emigrations rates. Since emigration differs between Swedish-born persons with different background, i.e. parents country of birth, emigration rates are divided into three groups; both parents are Swedish-born, foreign born or if one parent is foreign born and the other is Swedish-born. As could be seen in figure 2 below, persons with two parents born in another country have the highest emigration rate followed by those with one Swedish-born parent and one foreign born parent.

Figure 2. Emigration rates for Swedish-born by parents country of birth and age, 2008-2012

Per 1 000



Assumptions are made about the proportions of Swedish-born by parents' country of birth and the emigration rates are weighted to emigration rates for the whole group of Swedish-born. The rates are then used in the population projection.

When it comes to re-immigration of Swedish-born in the population projection, we use a model that first estimates a re-immigrant rate, applies this to a population of Swedish-born living abroad and then adjusts the number of re-immigrants with a regression model based on the emigration three years earlier. This study is based on earlier work at Statistics Sweden where no assumptions have been made on the re-immigrants' background (Statistics Sweden, 2009). But we have recently been able to see that the rates for re-immigration differ depending on the parents' background and this particularly applies to children. For example, the re-immigration of children was a large bias in the latest national population projection. Therefore, the aim of this study is to investigate whether parents' background should be taken into consideration when estimating the future re-immigration of Swedish-born.

Data and method

Two administrative registers from Statistics Sweden have been used in this study. Flows of emigration and immigration have been collected from the Register of the Total Population. Data on parents' country of birth has been derived from the Multi-Generation Register, a register where information about parents is available since 1969 and for persons born 1932 or after. When information about parents is missing, we assume that they have two Swedish-born parents. This mostly applies to persons born earlier than 1932. To be an emigrant, you need to have the intention to stay at least one year abroad and have reported it to the National Tax Board.

There is no comprehensive register of Swedish-born living abroad. The Swedish Pension Agency has information on persons who live abroad and who had an income in Sweden. But this information does not include those who have not had an income in Sweden, such as those who emigrate at a young age. The National Tax Board has information on Swedish citizens living in another country. This information is nevertheless saved for ten years. To estimate the number of Swedish-born that are living in another country we

use information about immigration and emigration from our registers. The proportion of emigrants of Swedish-born with either two Swedish-born parents, two foreign born parents or one Swedish-born parent has then been applied on each year's number of emigrants. The estimated number of Swedish-born abroad is then calculated as:

$$SB_t = E_t - I_t + SB_{t-1}(1 - q_t)$$

where,

E_t is the number of emigrants at year t

I_t is the number of immigrants at year t

q_t is the death-risks at year t

For those aged 0, $SB_t = E_t$

Death risks are the same as for all persons living in Sweden, even if there could be a selection effect for those who migrates. The age- and sex-specific death risks are also assumed to be the same whether the parents country of birth. Since there are very few migrants aged 70 and older, this study only include persons younger than that. Information about the number of persons living abroad is then used to estimate a 5 year average age- and sex-specific re-immigration rate for each of the three groups:

$$\hat{R}_t = \frac{\sum_{i=0}^5 I_{(t-i)}}{\sum_{i=0}^5 M_{(t-i)}}$$

where,

I_t is the number of Swedish-born immigrants at year t

M_t is the mean population of Swedish-born living abroad at year t

For those aged 0 and 1, $\hat{R}_t = 0$

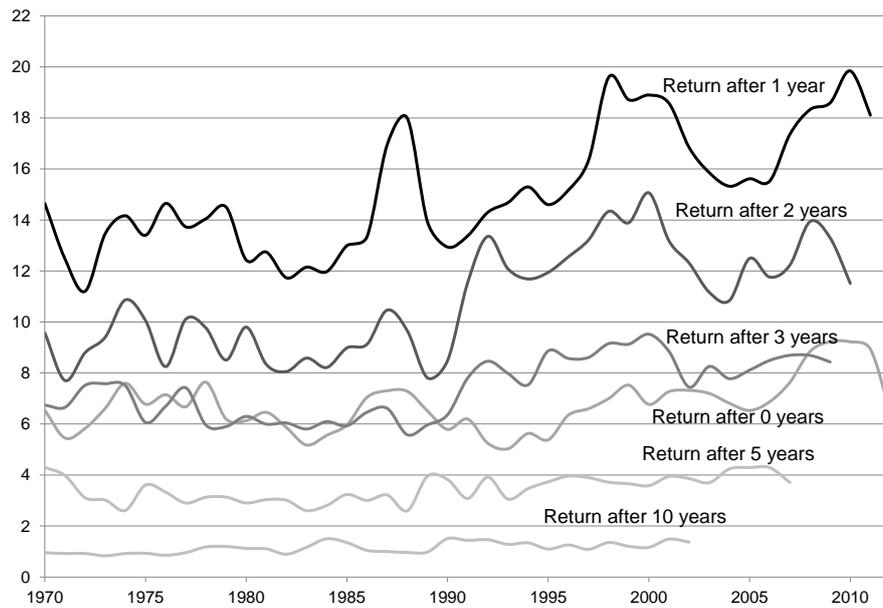
Model for return immigration of Swedish-born

The share of re-immigrants differs among the different emigration cohorts¹. Variations in the share of re-immigrants occurs in largest extend during the first and second year after emigration but flattens out the longer the stay abroad. It is thus the first and second year after emigration that the share of the return immigrants differ from the different emigration cohorts and are therefore assumed to be the most sensitive for fluctuations in the business cycle. This could be seen in figure 3 as the lines move in parallel over the years that the differences in levels of the first years' return immigration have not changed especially.

¹ Emigration cohorts refer here to persons who emigrated during a certain year.

Figure 3. Proportion of immigrated Swedish-born persons who immigrate by year of emigration and time since emigration, 1970-2012

Percent



As seen in figure 4, an estimation of immigration only based on re-immigration rates does not follow the observed development particularly well. The figure also shows that re-immigration in some extent follows the number of emigrants, but with a few years delay. However, a linear regression model where immigration estimated by re-immigration rates combined with information on emigration three years earlier gives estimates that are relatively close to the observed re-immigration². The regression estimates are given by:

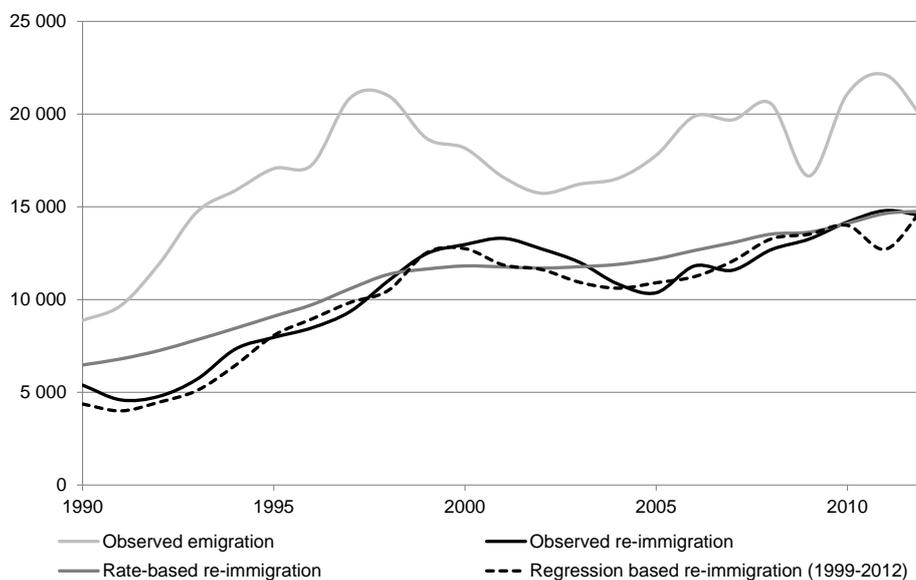
$$\hat{I}_t^{\text{reg}} = -3882 + 0,69 \cdot \hat{I}_t^r + 0,42 \cdot E_{t-3}$$

where,

$$\hat{I}_t^r = \hat{R}_t^5 \cdot SB_{t-1}$$

Figure 4. Observed emigration and re-immigration and rate based re-immigration and regression based re-immigration. 1990-2012

Numbers



² R²=0,79 when based on the period 1999 – 2012

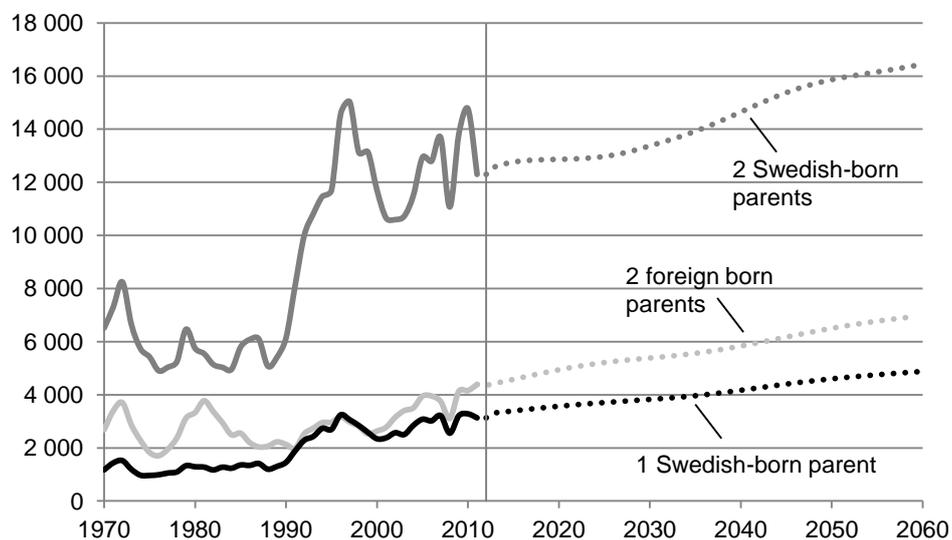
Results

As an example of results from the model, we illustrate here the forecast emigration and return immigration of Swedish-born by background applied to Statistics Sweden's latest official population projection.

The emigration of Swedish-born with two Swedish-born parents increased rapidly during the financial crisis in the mid-1990s and continued to be at a high level during the 2000s. Swedish-born with two foreign born parents and one Swedish-born parent has also somewhat experienced an increase during the same period. The future emigration are based on emigration rates for the period 2008 to 2012 and the proportion of emigrants by parents country of birth is taken from the period 2007 – 2012. The results shows a steady increase for all groups and an emigration of more than 16 000 persons with two Swedish-born parents at year 2060. Similar could be seen for the two other groups with an emigration of nearly 7 000 Swedish-born with two foreign born parents and around 4 800 Swedish-born with one Swedish-born parent at the end of the period.

Figure 5. Emigration of Swedish-born by parents country of birth 1970-2012 and projection 2013-2060

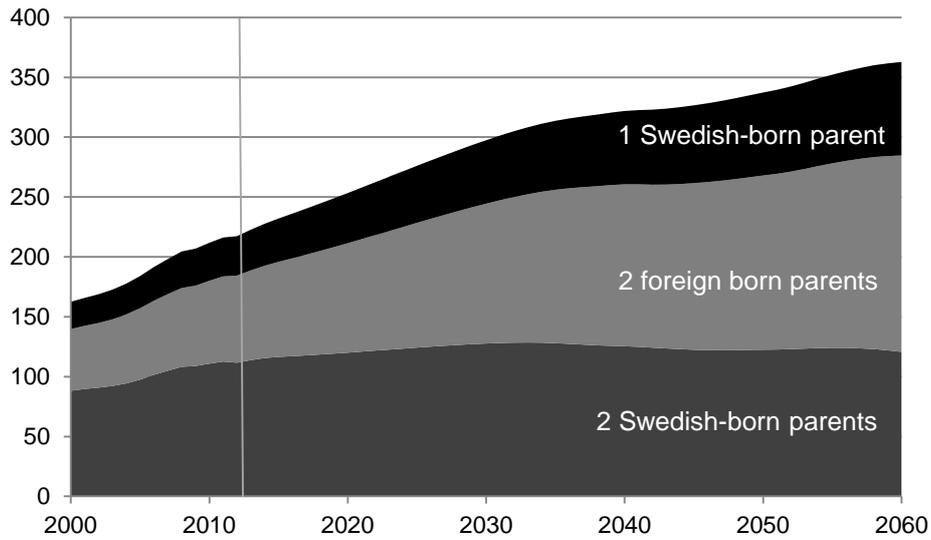
Numbers



As shown in figure 6 below, about 220 000 Swedish-born persons were estimated to live in another country than Sweden at year 2012. The largest group, persons with two Swedish-born parents, constitutes about half of the population. The second largest group is of persons with two foreign born parents. All three groups increases until the first years of 2030s when the number of Swedish-born with two Swedish-born parents decreases and finally stabilizes around 120 000 persons until the end of the forecast period. The number of persons with two foreign born parents continues to increase during the whole period, leading them to exceed the numbers of persons with two Swedish-born parents in the late 2020s. The estimated number of persons with two foreign born parents living in another country in 2060 is nearly 165 000. The number of persons with one Swedish-born parent living abroad is about 80 000 at the end of the forecast period.

Figure 6. Estimated Swedish-born living abroad by parents country of birth 2000-2012 and projection 2013-2060

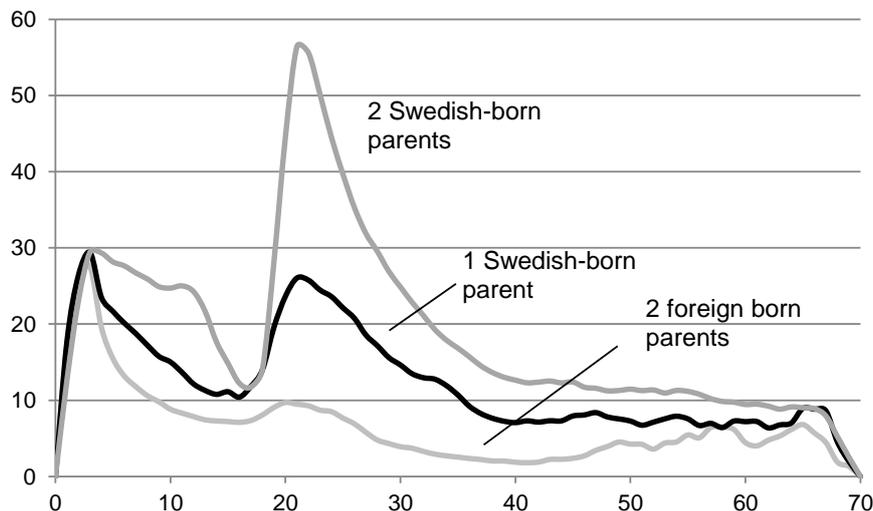
Thousands



The rates for return immigration differs depending on parents country of birth. Persons with two foreign born parents are least likely to return again to Sweden after they have emigrated. This applies to all ages except for those aged three where all groups have about 30 return immigrants per 100. The highest tendency to return to Sweden have persons with two Swedish-born parents and with a peak for persons in their early twenties where about 55 persons per 100 re-immigrates. The structure of the age-specific rates for persons with one foreign born parent are similar but not as high as the rates for person with two Swedish-born parents.

Figure 7. Immigration rates for Swedish-born by parents country of birth and age, 2008-2012

Per 100

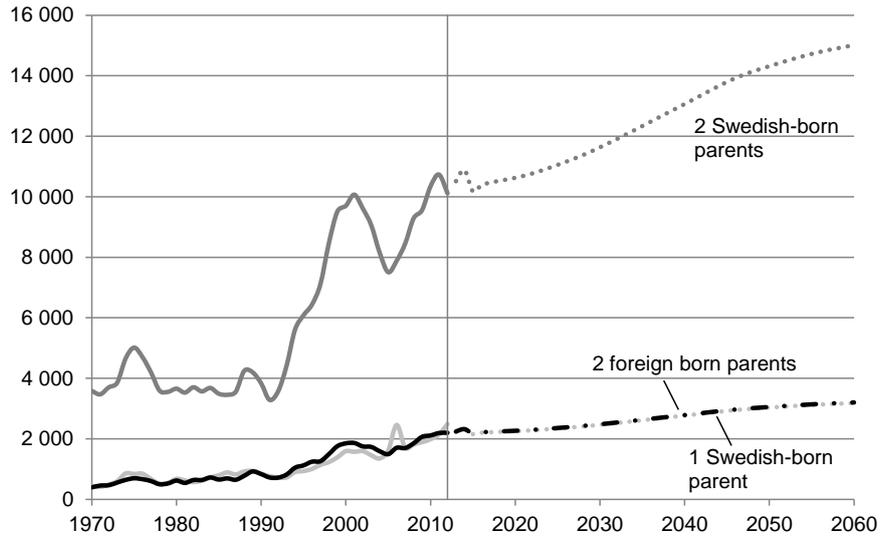


Age

The rapid rise of emigrants with two Swedish-born persons in the mid-1990s led to a subsequent increase of re-immigrants, shown in figure 8. The high numbers of returning persons with two Swedish-born parents will continue to increase during the forecast period with about 15 000 persons returning at year 2060. The long-term increase in the estimated number of persons re-immigrating is due to the number of Swedish-born persons abroad grows according to the calculations. Even though there is a large number of estimated persons with two foreign born parents living abroad, the relative low rates for return immigration means that a low number decides to return to Sweden.

Figure 8. Return immigration of Swedish-born by parents country of birth 1970-2012 and projection 2013-2060

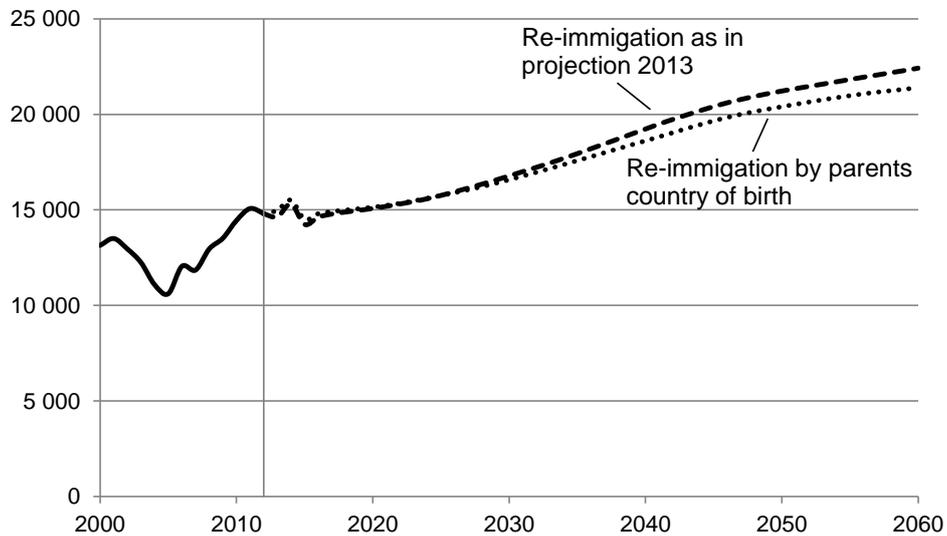
Numbers



When comparing the projection of return immigrants based on analysis on parents background and the latest official projection (Statistics Sweden, 2013), the return immigration is about the same for the first 20 years. After 2030, the estimated number of return migrants given by this study's results are not increasing at the same pace as the official projection leading to about 1 000 less return immigrants per year at the end of the period.

Figure 9. Swedish-born re-immigration 2000-2012 and projection 2013-2060

Numbers



Concluding comments

By looking at parents country of birth there's a clear pattern of different behaviour when it comes to return immigration for Swedish-born persons. Those with two foreign born parents are the ones' that are the most eager to leave the country and returns to Sweden in the least extend. This leads to an increasing number of Swedish-born with two foreign born parents living abroad. Emigrating persons with two Swedish-born parents are by far the largest group which leads them to consist a major proportion of all Swedish-born living abroad. Although since this group have high rates of return immigration, a large number is also returning to Sweden. A development that leads to that the number of persons living in another country with two foreign born parents exceeds those with two Swedish-born parents during the projected period. Compared to Statistics Sweden's population projection (Statistics Sweden, 2013), the results from this study are about the same until the 2030s and after that, there's only a smaller difference between the two projections. This shows that including the variable parents country of birth is not necessary when making projections on the future return immigration of Swedish-born

References

Statistics Sweden (2009), Background material about demography, children and family 2009:1, *Model to forecast the re-immigration of Swedish-born.*

Statistics Sweden (2013), *The future population of Sweden 2013 – 2060.*