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# DEMIFER
# Demographic and migratory flows affecting European regions and cities

## Applied Research Project 2013/1/3

## Deliverable 4
## Multilevel scenario model

Prepared by
Dorota Kupiszewska and Marek Kupiszewski
Central European Forum for Migration and Population Research
Warsaw, Poland

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# 1. Introduction

In order to assess the effects of demographic trends and migratory flows on European regions, a forecasting tool is needed that would allow to put together the available quantitative information and generate a set of scenarios of population development. Thus, a specialised multiregional population projection model is needed, able to handle the diversity of demographic patterns in Europe as well as the complex interaction patterns related with three different levels of migration streams: internal, international intra-Europe and extra-Europe. In addition to forecasting the impact of future developments in fertility, mortality and migration on regional population growth and on changes in age structures, the model should also show possible developments of the labour force, taking into account future changes in economic activity rates. Moreover, after translating the socio-economic and environmental developments into demographic and labour-force variables, the model should enable the assessment of the effects of economy and policy options and the effects of climate change.

The starting point for the preparation of the multilevel scenario model was the MULTIPOLES model developed by Kupiszewski and Kupiszewska (1998, 2005) and successfully used in a number of research projects (Kupiszewski and Kupiszewska, 1999; Bijak et al, 2007, 2008a, 2008b; Bijak and Kupiszewski, 2008). It has been revised considerably in order to best serve the needs of DEMIFER, among others to improve the scenario setting and analysis of all the results on the regional level. The modifications included the following changes:

- Extension of the overall number of regions that the model can handle from 160 to 290, which allows to model 287 ESPON-space regions.
- Modification of the way in which the assumptions concerning all the components of population change are formulated:
    - Within the new Option 2, input data are provided for demographic rates (as opposed to data on events, used under Option 1);
    - International migration to/from the rest of the world (extra-Europe migration in DEMIFER) is modelled through emigration rates and immigration numbers (as opposed to net migration in Option 1);
    - Fertility scenarios are prepared for region and age specific fertility rates instead of country-level total fertility rates;
    - Mortality scenarios are set for region, sex and age specific mortality rates instead of country-level, sex-specific life expectancy at birth;
    - In the internal migration scenarios, the changes in the out-migration rates can depend on both the origin and destination region, unlike within Option 1, where it was assumed that the changes depend on the destination region only;
    - International migration scenarios can be region-specific (within Option 1 emigration rates changed uniformly across all the regions of a given country);
    - Economic activity rates are specified for each region instead of country-level rates.
- Extension of the model from eighteen age groups (to 85+) to 21 age groups (up to 100+), motivated by the increasing longevity of European populations and the rising probability that people will survive into their nineties.
- Generation of population accounts for the regions (in addition to the accounts for the countries).
- Calculation of the dependency ratios for the regions (in addition to the previous calculations for the countries).
- Calculation of an additional indicator (VODR – very old age dependency ratio).
- Generation of selected results for types of regions.

- Change of the format of the input and output files in order to facilitate the handling of the data in Excel.

Further, we present the MULTIPOLES version used in DEMIFER, so taking into account all the changes. More precisely, MULTIPOLES Option 2 is described.

## 2. MULTIPOLES overview

The MULTIPOLES is a cohort-component, hierarchical, multiregional, supranational model of population dynamics. It may be used for forecasts, projections and simulations. The population is disaggregated into sexes and 21 five-year age groups, i.e. 22 projection cohorts, with the youngest cohort being the infant cohort (children born during the projection interval) and the cohort 100+ being the oldest one. Alternatively, the model can be run for 18 age groups, with the 85+ oldest age group. In DEMIFER, the disaggregation into 21 age groups (to 100+) was used. Geographically, the population is disaggregated into countries and regions. On top of population modelling comes labour force modelling, based on the application of externally assumed labour force participation rates to the modelled population. Projections can cover up to ten intervals of five year duration each, so a 50 years period maximum. In DEMIFER, all projections were prepared for nine 5-year periods, from 2005 till 2050.

An important feature of MULTIPOLES is that the projections are prepared simultaneously for all the countries of the system, instead of projecting population of each country separately. The maximum number of countries and regions that can be modelled has been set to 31 countries, 49 regions in a country, and 290 regions in the whole system. These limits may be changed (but the computer code has to be recompiled). In DEMIFER, the model covered 31 countries. The regional division was based on NUTS 2. Eight out of 31 countries consist of a single region, the remaining ones have from 2 (Ireland) to 39 (Germany) NUTS 2 regions. Altogether, the 287 European regions were modelled (see Table 1).

The MULTIPOLES model has been specifically designed to model a population system composed of a number of countries and regions, and in particular to facilitate the modelling of the impact of international migration on population dynamics, in addition to modelling the impact of the other population change components. Population of each region may change due to births, deaths and migration. Following the ideas of Rees implemented in early 90ties in a model for the then 12 member states of the European Community (Rees et al, 1992; Rees, 1996), migration is handled on three levels:

- interregional migration within each country;
- interregional international migration within the system (in DEMIFER: international migration within Europe);
- migration to/from the rest of the world (in DEMIFER: extra-Europe migration).

The results of the projection are generated for the regions and for the countries. Selected results are also generated for the types of regions, using the regional typology provided in an input file. In DEMIFER, the regional typology prepared within Deliverable 3 was used.

The MULTIPOLES software has been developed and improved in the period 1996-2010 within a variety of research projects. It was written in FORTRAN and compiled to run under

the MS Windows operating system. The most recent version of MULTIPOLES, described in this document, is from March 2010. In addition to projection calculations, MULTIPOLES can be used to perform replacement migration calculations, however this feature has not been described here as it was not used in DEMIFER.

A number of assumptions have been made when developing the model, as indicated further. They were a compromise between the modelling needs of the research projects in which the model was used (in particular the needs of DEMIFER) and data availability. These assumptions may be not appropriate for some future applications – in such cases the MULTIPOLES model should be modified to meet the new requirements.

**Table 1. Geographical structure of the projection model in DEMIFER**

| Country name | Number of NUTS 2 regions | Country name | Number of NUTS 2 regions |
|---|---|---|---|
| Austria | 9 | Italy | 21 |
| Belgium | 11 | Liechtenstein | 1 |
| Bulgaria | 6 | Lithuania | 1 |
| Switzerland | 7 | Luxembourg | 1 |
| Cyprus | 1 | Latvia | 1 |
| Czech Republic | 8 | Malta | 1 |
| Germany | 39 | Netherlands | 12 |
| Denmark | 5 | Norway | 7 |
| Estonia | 1 | Poland | 16 |
| Spain | 19 | Portugal | 7 |
| Finland | 5 | Romania | 8 |
| France | 26 | Sweden | 8 |
| Greece | 13 | Slovenia | 2 |
| Hungary | 7 | Slovakia | 4 |
| Ireland | 2 | United Kingdom | 37 |
| Iceland | 1 | Europe altogether | 287 |

## 3. How does MULTIPOLES software work?

The projection model used in the MULTIPOLES software is based on the movement type population accounts (see Section 4.3). The demographic rates appearing in the accounts are defined as the number of events (deaths, migration or births) in a projection period divided by the population at risk, assumed to be equal to the mid-year population or calculated as an arithmetic average of the population of the projection cohort at the beginning and at the end of the projection period.

The sequence of operations in MULTIPOLES is as follows:

1. Data input.
2. Calculation of the benchmark fertility, mortality, out-migration and emigration rates.
3. Projection loop:
    - Update of the demographic rates according to the scenarios;
    - Update of immigration from the rest of the world according to the scenario;

- Calculation of the population at the end of the current projection step for all the age groups except the youngest one;
- Calculation of the number of births during the current projection interval and the size of the youngest age group at the end of the projection step;
- Preparation of population accounts;
- Labour force calculations;
- Calculation of the dependency ratios;
- The above steps are repeated until the end of the projection period is reached.

4. Output of the results.

Input data are prepared as a set of text (ASCII) files. The list of required data is given in Section 4.2, 5 and Appendix A.

The output files are text files that can be loaded into Excel or a mapping software for further analysis. They include information on projected population and labour force numbers (by region, sex and age), on projected numbers of demographic events in each region in each projection period, as well as the values of various indicators such as the old-age dependency ratio. The contents of the output files is presented in more detail in Section 6 and Appendix B.

# 4. The mathematical engine of MULTIPOLES

## 4.1 Notation

The following notation has been used in the equations below:

| | | |
|---|---|---|
| $t$ | – | time; |
| $g$ | – | sex index (f – females, m – males); |
| $a$ | – | age group index; |
| 00 | – | index of the youngest age group (children born during the projection interval); |
| *ir, jr* | – | region (for migration variables: origin and destination region); |
| *is, js* | – | country (for migration variables: origin and destination country). |
| A+ | – | index of the oldest, open-end age group, covering persons of age A or more (85+ or 100+); |
| $P_{ag}^{(is,ir)}(t)$ | – | population in age group $a$, sex $g$, in region *ir* in country *is* at time $t$; |
| $B_g^{(is,ir)}(t)$ | – | births of children of sex $g$ in region *ir* in country *is* over the period $(t,t+5)$; |
| $D_{ag}^{(is,ir)}(t)$ | – | deaths in age group $a$, sex $g$, in region *ir* in country *is* over the period $(t,t+5)$; |
| $d_{ag}^{(is,ir)}(t)$ | – | death rate in age group $a$, sex $g$, in region *ir* in country *is* in the period $(t,t+5)$; |
| $M_{\mathrm{IR}ag}^{(is,ir)(is,jr)}(t)$ | – | internal migration from region *ir* to region *jr* in country *is* in age group $a$, sex $g$, over the period $(t,t+5)$ (subscript IR denotes interregional internal migration); |
| $m_{\mathrm{IR}ag}^{(is,ir)(is,jr)}(t)$ | – | rate of out-migration from region *ir* to region *jr* in country *is* in age |

group $a$, sex $g$, over the period ($t$,$t$+5);

$M_{\mathrm{IS}ag}^{(is,ir)(js,jr)}(t)$ – international migration from region $ir$ in country $is$ to region $jr$ in country $js$ in age group $a$, sex $g$, over the period ($t$,$t$+5) (subscript IS denotes interstate migration);

$m_{\mathrm{IS}ag}^{(is,ir)(js,jr)}(t)$ – rate of emigration from region $ir$ in country $is$ to region $jr$ in country $js$ in age group $a$, sex $g$, over the period ($t$,$t$+5);

$I_{ag}^{(is,ir)}(t)$ – immigration from the rest of the world to region $ir$ in country $is$ in age group $a$, sex $g$, over the period ($t$,$t$+5);

$E_{ag}^{(is,ir)}(t)$ – emigration from region $ir$ in country $is$ to the rest of the world, in age group $a$, sex $g$, over the period ($t$,$t$+5);

$e_{ag}^{(is,ir)}(t)$ – overall rate of emigration from region $ir$ in country $is$ to anywhere abroad, in age group $a$, sex $g$, over the period ($t$,$t$+5);

$f_{\mathrm{ag}}^{(is,ir)}$ – labour force participation rate in age group $a$, sex $g$, region $ir$ in country $is$.

## 4.2 Data input and calculation of updated demographic rates

In DEMIFER's Option 2, all scenarios concerning fertility, mortality, internal migration and international migration, except the scenario on immigration from the rest of the world, are set in terms of demographic rates by 5-year age group and region. The input data are provided for the period-age observation plan and one-year periods, and then all the rates (fertility, mortality, out-migration and emigration) are recalculated into the period-cohort observation plan and 5-year time intervals, as required for the projection calculations.

Mortality rates have to be provided for each sex and 21 age groups, up to 100+. Fertility rates are required for seven age groups, from 15-19 to 45-49. It is assumed that fertility is zero below 15 years of age and above 49.

Internal out-migration rates and international emigration rates have to be provided for the benchmark period for each sex and 5-year age group (to 100+), together with a set of multipliers which define the rates in each projection period in relation to the rates in the previous period (or, for the benchmark year, in relation to the benchmark). For internal migration, a different age profile may be specified for each pair of origin-destination regions and sex. For international migration, age profiles are specified for each origin region and sex. The rates for the next projection period are obtained as a product of a multiplier and a relevant migration rate taken from the preceding projection period. For internal migration, the multipliers depend on both the origin and destination region, as well as sex. For international migration, the multipliers depend on sex and the region of origin. It is assumed that age profile of internal and international migrant does not change during the projection.

International emigration rates described above specify the rate of emigration from the regions of the modelled system to anywhere abroad that is to all other countries within the system and to the rest of the world altogether. International emigration rates for each pair of regions within the system and the rates of emigration from each region of the system to the rest of world are estimated within MULTIPOLES using the overall emigration rates combined with the input data on the distribution of emigrants among the destination countries (including the

rest of the world) and the distribution of immigrants among the regions in the destination countries. Geographical distributions may change over time and may be sex-specific. If there is no information on the distribution of migrants among the regions of a destination country, MULTIPOLES will assign them in proportion to the region population.

Scenarios for immigration from the rest of the world are defined in terms of the average absolute number of immigrants (per year), by sex, to each country in each projection period. Additionally, age structure of immigrants must be provided, assuming that it depends on destination country and sex but is constant in time. Period-age input data are recalculated in MULTIPOLES into the appropriate 5-year period-cohorts. The distribution of immigrants from the rest of the world among the regions may be specified in the input file. If no such information is provided for a country, it is assumed that migrants are distributed among the regions of this country proportionally to their population.

Labour force scenarios are set through activity rates provided in the input file for each region, sex and 5-year age group (thirteen 5-year age groups, from 15 to 75+ years of age). It is assumed that labour force participation rates below the age of 15 years are equal to 0. The activity rates may change over time.

## 4.3 Projection equations

Projection equations for all projection cohorts except the youngest and the oldest one have been derived using the following equations[1] as a starting point:

$$
\begin{aligned}
P_{a+5}^{(is,ir)}(t+5) = P_a^{(is,ir)}(t) - D_a^{(is,ir)}(t) + \\
- \sum_{jr \neq ir} M_{\mathrm{IR}a}^{(is,ir)(is,jr)}(t) - \sum_{js \neq is} \sum_{jr} M_{\mathrm{IS}a}^{(is,ir)(js,jr)}(t) - E_a^{(is,ir)}(t) + \\
+ \sum_{jr \neq ir} M_{\mathrm{IR}a}^{(is,jr)(is,ir)}(t) + \sum_{js \neq is} \sum_{jr} M_{\mathrm{IS}a}^{(js,jr)(is,ir)}(t) + I_a^{(is,ir)}(t),
\end{aligned}
$$

$$
\begin{aligned}
d_a^{(is,ir)}(t) &= \frac{D_a^{(is,ir)}(t)}{0.5(P_a^{(is,ir)}(t) + P_{a+5}^{(is,ir)}(t+5))}, \\
m_{\mathrm{IR}a}^{(is,ir)(is,jr)}(t) &= \frac{M_{\mathrm{IR}a}^{(is,ir)(is,jr)}(t)}{0.5(P_a^{(is,ir)}(t) + P_{a+5}^{(is,ir)}(t+5))}, \\
m_{\mathrm{IS}a}^{(is,ir)(js,jr)}(t) &= \frac{M_{\mathrm{IS}a}^{(is,ir)(js,jr)}(t)}{0.5(P_a^{(is,ir)}(t) + P_{a+5}^{(is,ir)}(t+5))}, \\
e_a^{(is,ir)}(t) &= \frac{\sum_{js \neq is} \sum_{jr} M_{\mathrm{IS}a}^{(is,ir)(js,jr)}(t) + E_a^{(is,ir)}(t)}{0.5(P_a^{(is,ir)}(t) + P_{a+5}^{(is,ir)}(t+5))}.
\end{aligned}
$$

The first equation shows that population in age group *a* in region (*is,ir*) decreases through deaths, out-migration to other regions in the same country, emigration to the regions in other countries and emigration to the rest of the world, and increases through in-migration from other regions in the same country, immigration from the regions in other countries and immigration from the rest of the world. The further equations define respectively mortality

[1] Please note that the equations for both sexes are identical so the sex index has been omitted for the sake of greater clarity. It appears in the equation for births only (in the expression for the population at risk).

rates, out-migration rates, international emigration rates and overall international emigration rates.

As a result, the following matrix equation has been obtained and is used in MILTIPOLES:

$$\mathbf{P}_{a+5}(t+5) = [\mathbf{I} + 0.5\mathbf{M}_a(t)]^{-1}[\mathbf{I} - 0.5\mathbf{M}_a(t)]\,\mathbf{P}_a(t) + [\mathbf{I} + 0.5\mathbf{M}_a(t)]^{-1}\mathbf{M}_{\mathrm{EXT}a}(t)\,.$$

In the above equation. **I** is the identity matrix, $\boldsymbol{P}_a$(t) is a vector composed of populations in age group *a* in all individual regions at time *t*:

$$\boldsymbol{P}_a = [P_a^{(1,1)}, \ldots, P_a^{(1,nr(1))}, \ldots, P_a^{(is,1)}, \ldots, P_a^{(is,ir)}, \ldots, P_a^{(is,nr(is))}, \ldots, P_a^{(ns,1)}, \ldots, P_a^{(ns,nr(ns))}]^{\mathrm{T}},$$

where *nr*(*is*) is the number of regions in country *is* and *ns* is the number of countries in the system.

Similarly, $\mathbf{M}_{\mathrm{EXT}a}(t)$ is a vector composed of immigration flows from the rest of the world in age group *a* to all individual regions, $I_a^{(is,ir)}(t)$.

Matrix $\mathbf{M}_a(t)$ depends on death rates and migration rates. The diagonal elements are defined as follows:

$$M_a^{(is,ir)(is,ir)}(t) = d_a^{(is,ir)}(t) + \sum_{jr} m_{\mathrm{IR}a}^{(is,ir)(is,jr)}(t) + e_a^{(is,ir)}(t).$$

The non-diagonal elements have the form:

$$M_a^{(is,ir)(is,jr)}(t) = -m_{\mathrm{IR}a}^{(is,jr)(is,ir)}(t) \quad \text{for } ir \neq jr;$$
$$M_a^{(is,ir)(js,jr)}(t) = -m_{\mathrm{IS}a}^{(js,jr)(is,ir)}(t) \quad \text{for } is \neq js.$$

For the oldest age group, the projection equation is:

$$\mathbf{P}_{A+}(t+5) = [\mathbf{I} + 0.5\mathbf{M}_{A+}(t)]^{-1}[\mathbf{I} - 0.5\mathbf{M}_{A+}(t)]\,\mathbf{P}_{A+}(t) + [\mathbf{I} + 0.5\mathbf{M}_{A+}(t)]^{-1}\mathbf{M}_{\mathrm{EXT}A+}(t) +$$
$$+ [\mathbf{I} + 0.5\mathbf{M}_{A-5}(t]^{-1}[\mathbf{I} - 0.5\mathbf{M}_{A-5}(t)]\,\mathbf{P}_{A-5}(t) + [\mathbf{I} + 0.5\mathbf{M}_{A-5}(t)]^{-1}\mathbf{M}_{\mathrm{EXT}(A-5)}(t).$$

The youngest projection cohort comprises children born during the projection interval. The equations used to derive the projection equation for this cohort are:

$$P_0^{(is,ir)}(t+5) = B^{(is,ir)}(t) - D_{00}^{(is,ir)}(t) +$$
$$- \sum_{jr \neq ir} M_{\mathrm{IR}00}^{(is,ir)(is,jr)}(t) - \sum_{js \neq is} \sum_{jr} M_{\mathrm{IS}00}^{(is,ir)(js,jr)}(t) - E_{00}^{(is,ir)}(t) +$$
$$+ \sum_{jr \neq ir} M_{\mathrm{IR}00}^{(is,jr)(is,ir)}(t) + \sum_{js \neq is} \sum_{jr} M_{\mathrm{IS}00}^{(js,jr)(is,ir)}(t) + I_{00}^{(is,ir)}(t),$$

$$d_{00}^{(is,ir)}(t) = \frac{D_{00}^{(is,ir)}(t)}{0.5P_0^{(is,ir)}(t+5)},$$

$$m_{\mathrm{IR}00}^{(is,ir)(is,jr)}(t) = \frac{M_{\mathrm{IR}00}^{(is,ir)(is,jr)}(t)}{0.5P_0^{(is,ir)}(t+5)},$$

$$m_{\mathrm{IS}00}^{(is,ir)(js,jr)}(t) = \frac{M_{\mathrm{IS}00}^{(is,ir)(js,jr)}(t)}{0.5P_0^{(is,ir)}(t+5)},$$

$$e_{00}^{(is,ir)}(t) = \frac{\sum_{js \neq is} \sum_{jr} M_{\mathrm{IS}00}^{(is,ir)(js,jr)}(t) \; + \; E_{00}^{(is,ir)}(t)}{0.5 P_0^{(is,ir)}(t+5)}$$

$$b_a^{(is,ir)}(t) = \frac{B_a^{(is,ir)}(t)}{0.5(P_{a\mathrm{f}}^{(is,ir)}(t) + P_{(a+5)\mathrm{f}}^{(is,ir)}(t+5))},$$

$$B_g^{(is,ir)}(t) = 0.5 \; s_g^{is} \; \sum_a b_a^{(is,ir)}(t)[P_{a\mathrm{f}}^{(is,ir)}(t) + P_{(a+5)\mathrm{f}}^{(is,ir)}(t+5)].$$

In the above formulae, subscript f refers to females, $b_a^{(is,ir)}(t)$ are fertility rates and $s_g^{is}$ is the proportion of children of sex *g* among newborn children in country *is*.

The resulting projection equation for the youngest group is then:

$$\mathbf{P}_0(t+5) = [\mathbf{I} + 0.5\mathbf{M}_{00}(t)]^{-1}[\mathbf{B}(t) + \mathbf{M}_{\mathrm{EXT}00}(t)],$$

where $\mathbf{B}(t)$ is a vector composed of births in all individual regions, $B^{(is,ir)}(t)$.

### 4.4 Labour force and dependency ratio calculations

Labour force calculations are performed by applying region-, sex- and age-specific labour force participation rates to the regional populations. Labour force participation rates and labour force numbers refer to the active population, i.e. employed and unemployed.

Four dependency ratio indicators are calculated for each region, each region type and each country: old-age dependency ratio (ODR), economic old-age dependency ratio (EODR), labour market dependency ratio (LMDR) and very-old-age dependency ratio (VODR). ODR is a ratio of population aged $a_2$ years or more to the population in the age between $a_1$ and $a_2$ years. EODR is defined as a ratio of economically inactive population in the age of $a_2$ years or more to the whole active population aged $a_1$ years or more. LMDR is defined as a ratio of the whole economically inactive population to the whole active population, both considering people aged $a_1$ years or more. Finally, VODR is the ratio of population aged $a_3$ years or more (where $a_3$ is greater than $a_2$) to the whole active population aged $a_1$ years or more. The following formula are used for calculating the indicators for the regions:

$$\mathrm{ODR}(is,ir) = \sum_g \sum_{a_2}^{A+} P_{ag}^{(is,ir)} \Big/ \sum_g \sum_{a_1}^{a_2-5} P_{ag}^{(is,ir)},$$

$$\mathrm{EODR}(is,ir) = \sum_g \sum_{a_2}^{A+} P_{ag}^{(is,ir)}(1 - f_{ag}^{(is,ir)}) \Big/ \sum_g \sum_{a_1}^{A+} P_{ag}^{(is,ir)} f_{ag}^{(is,ir)},$$

$$\mathrm{LMDR}(is,ir) = \sum_g \sum_{a_1}^{A+} P_{ag}^{(is,ir)}(1 - f_{ag}^{(is,ir)}) \Big/ \sum_g \sum_{a_1}^{A+} P_{ag}^{(is,ir)} f_{ag}^{(is,ir)},$$

$$\mathrm{VODR}(is,ir) = \sum_g \sum_{a_3}^{A+} P_{ag}^{(is,ir)} \Big/ \sum_g \sum_{a_1}^{A+} P_{ag}^{(is,ir)} f_{ag}^{(is,ir)}.$$

The age limit parameters $a_1$, $a_2$ and $a_3$, the same for all the regions, are set by the user in an input file. The typical values are 15, 65 and 75 years.

## 5. Data preparation

The following main groups of data are required as an input to the MULTIPOLES software under Option 2:

- Parameters of the projection;
- Region and country names and codes;
- Region typology;
- Regional population stocks at the start of the projection, by sex and 5-year age group (to 100+);
- Scenario data for all the component of population change:
    - Mortality rates by region, sex and 5-year age group (to 100+);
    - Fertility rates by region and 5-year age group (15-49);
    - Internal out-migration rates by origin and destination region, sex and 5-year age group (to 100+);
    - Emigration rates by region, sex and 5-year age-group (to 100+);
    - Percentage distribution of emigrants from each origin country among the destination countries (including the rest of the world), by sex;
    - Distribution of immigrants arriving to each country from other countries of the system among the destination regions, by sex;
    - Annual number of immigrants from the rest of the world arriving to each country;
    - Share of males among the immigrants from the rest of the world, by destination country;
    - Age distribution of immigrants from the rest of the world, by destination country and sex;
    - Distribution of immigrants arriving to each country from the rest of the world among the destination regions, by sex;
- Scenario data on economic activity rates, by region, sex and 5-year age group (15-75+).

As mentioned in Section 4.2, scenarios on out-migration and emigration rates are defined by providing benchmark values and multipliers. The benchmark values may be either calculated using data observed in a reference period or, if not available, estimated. Formally, these data do not have to reflect the situation at the starting point of the projection (although they will in most applications), but they should set the reference levels of the relevant quantities, against which the scenarios are formulated.

Data on internal migration in the reference year are required as full origin-destination-age-sex (ODAS) matrices of out-migration rates for each country. The estimates of these matrices must be prepared externally. If required ODAS matrices of flows are not available, they may be reconstructed for example from the origin-destination flow data (OD or ODS) and origin-age-sex data (OAS). However, given a variety of data available in individual countries, the external strategies for estimating missing information on internal migration flows may be country-specific.

The MULTIPOLES model has been designed having in mind the common problems with international migration data in all the countries. Consequently, the data requirements are smaller than for internal migration. Eventually, the estimates of the full ODAS matrices of emigration rates for international migration flows between all the regions of the system of the countries are needed for making the projections. Needless to say, such data are not available and MULTIPOLES estimates them from less detailed data. These include: an OAS array of emigration rates (with origins covering all regions within the system), an ODS array

describing the share of migrants going to each destination country from each origin country, by sex. Additionally, distribution of immigrants by region may be provided for each sex. The main difficulty in preparing the required data is to overcome the problem of incomparability of data reported by the origin and destination countries. In DEMIFER, consistency was achieved by using the estimates of the matrix of flows between the countries by sex and age prepared within the MIMOSA (*Modelling of statistical data on migration and migrant populations*) project, instead of the incomparable data reported by national statistical offices. Similarly, the input data on the number and structure of immigrants from outside Europe were based on MIMOSA estimates.

A detailed specification of all the MULTIPOLES input data, including the format of the input files is provided in Appendix A. A description of the methodology implemented for the preparation of the input files for DEMIFER is provided in Deliverable 5 (data concerning the reference scenarios) and in Deliverable 6 (data on the policy scenarios).

## 6. Output files

The output files generated by MULTIPOLES contain data on population, labour force and dependency ratios at the start of the projection and at the end of each 5-year projection interval, as well as population accounts with the data on all the components of population change in each projection interval.

Population and labour force output data include in particular:
- Total population by country and sex (total, males, females);
- Total population by region type and sex;
- Total population by region and sex;
- Total labour force (active population, composed of employed and unemployed) and labour force in four broad age groups (15-25 , 25-40, 40-65 and 65+), by country and sex (total, males, females);
- Total labour force and labour force in four broad age groups (15-25 , 25-40, 40-65 and 65+) by region and sex;
- Population by country, sex and 5-year age group (to 100+);
- Population by region, sex and 5-year age group (to 100+);
- Labour force by country, sex and 5-year age group (15-75+);
- Labour force by region, sex and 5-year age group (15-75+).

Dependency ratio output files cover:
- Dependency ratios ODR, EODR, LMDR and VODR by country;
- Dependency ratios ODR, EODR, LMDR and VODR by region type;
- Dependency ratios ODR, EODR, LMDR and VODR by region.

Population accounts are generated for each sex (males, females, total) and 5-year projection step, separately for countries and regions. They show the values of initial and final population in each projection step and the values of the following components of population change:
- Births;
- Deaths;
- Natural increase;
- Internal in-migration;

- Internal out-migration (in the accounts for the countries it is by definition equal to internal in-migration);
- Immigration from the other countries of the system;
- Emigration to the other countries of the system;
- Immigration from the rest of the world;
- Emigration to the rest of the world;
- Net migration;
- Total population change.

A detailed specification of the output files, including all the variables is given in Appendix B.

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# Appendix A. Description of the input files for the MULTIPOLES model

## General information

This document describes the input files required by the MULTIPOLES software, for the set of options used in the DEMIFER project. The format of files is illustrated in Boxes 1-13[2] on the example of the input files for preparing a projection for three countries (13 regions altogether) and nine 5-year projection periods (2005-2050).

All files must be text files. The following characters are allowed as field separators: tab, comma, semicolon, space. The names of the regions and countries which appear in the files cannot contain these characters as they would be treated as separators. Slashes are also forbidden in the region and country names. Spaces and other forbidden characters may be replaced by underscores. The input files can be prepared using Excel and saved for example as tab-delimited (.txt) or csv (comma- or semicolon-separated) files.

The following input files are needed: a parameters file, a file with the list of the countries and regions, a file with the data on the regional populations at the start of the projection, files with the scenario data for all the components of population change (mortality, fertility, internal migration, international migration between the modelled countries and immigration from the rest of world) as well as a file with scenario data on labour force activity rates.

The files with data by age contain data by 5-year age group up to 100+ (21 age groups) or up to 85+ (18 age groups), according to the option specified in the parameter file. In the case of mortality, fertility and migration data, these are annual average data.

The data for the countries and regions must follow the order specified in the file containing the list of countries and regions.

The benchmark data may be either data observed in a reference year or over the recent years, or - if not available - the estimates. Formally, these data do not have to reflect the situation at the start point of the projection (although they will in most applications), but they should set the reference levels of the relevant quantities, against which the scenarios will be formulated.

In all the input files, the rows containing descriptions of the file contents, the rows with column heading and empty rows are ignored by MULTIPOLES, so their contents has no impact on the projection runs.

Various data options have been implemented in MULTIPOLES and the description in this document concerns the options used in DEMIFER, according to which the data on demographic rates (period-age rates) are provided in the input files (as opposed to the data on the number of events) and the scenarios concerning labour force activity rates are defined on the regional level.

[2] Boxes 1-13 were created by printing the Excel sheets which were used to produce MULTIPOLES input files. Please note that in some boxes region names and some column headings were truncated to fit the printout into the page width. Moreover, only Boxes 1, 2, 3 and 8 show the whole files. The remaining boxes show initial rows.

Whenever we talk about the country of origin or the country of destination of migrants, we have in mind the previous country of residence and the next country of residence.

### Parameters file (projection.tsv)

The parameter file has to be called projection.tsv. It contains values of user-defined parameters (numerical and text-type) and the names of the remaining input files. An example of such a file is presented in Box 1. When processing the file, MULTIPOLES ignores the explanatory text (usually given in the second column) and the names of the variables (in the last column) – they appear for the convenience of the user and the programmer. In the current version of the MULTIPOLES software, the restrictions concerning parameter values are as follows[3]:

- maximum number of countries 31;
- maximum number of regions per country 49;
- maximum overall number of regions 290.

Projections can be prepared for up to ten five-year periods, so for 50 years ahead (but several projection runs may be done, ten periods each, and thus cover a longer period, if a user so wishes).

Some other parameters defined in this file and needed for the set of MULTIPOLES options used in DEMIFER are:

- Separator of the input files (1 – tab, 2 – comma, 3- semicolon);
- Number of age groups – allowed values are 18 (age groups up to 85+) and 21 (age groups up to 100+);
- Lower and higher age limit used for dependency ratio calculations[4];
- Default proportion of males in births;
- Names of all the input files (other than projection.tsv);
- A short string of letters that is used by MULTIPOLES as the beginning of the names of the output files (to distinguish various scenarios).

### Countries and regions list

This file specifies the names and the codes of all countries and regions, as well as the number of regions in each country. All data in the remaining input files must follow the same order of countries and/or regions (as relevant). The names and codes provided in this file are used by MULTIPOLES were generating the output files with the projection results.

The format of the file is as follows (see Box 2):

- The first row - column headers;
- Rows with three items each: Country code, Country name, Number of regions;

[3] Please contact the authors if you are not happy with these restrictions.

[4] Four dependency ratio indicators are calculated for each region: old-age dependency ratio (ODR), economic old-age dependency ratio (ODRE) and labour market dependency ratio (LMDR) and very-old-age dependency ratio (VODR). ODR is a ratio of population aged a2 years or more to the population in the age between a1 and a2 years. ODRE is defined as a ratio of economically inactive population in the age of a2 years or more to the whole active population aged a1 years or more. LMDR is defined as a ratio of the whole economically inactive population to the whole active population, both considering people aged a1 years or more. VODR is a ratio of population aged a3 years or more to the whole active population aged a1 years or more. The age limit parameters a1, a2 and a3 are the same for all the countries. The typical values are 4 (denoting 15 years), 14 (65 years) and 16 (75 years).

- An empty row (may be used for comments) followed by the row with the column headers for the further rows;
- Rows with three items each: Country code, Region code, Region name.

**Region typology**

The file with the typology of regions (Box 3) has the following structure:
- Two rows that can be used for the description of the contents;
- Number of region types
- Column headers for the further rows
- Rows with four items each: Country code, Region code, Region name, Region type (expressed as a number).

## Initial population stocks

This file contains data on the population of each region by sex and 5-year age group at the start of the projection. The first two rows contain a description of the contents of the file, the next one contains column headings. The remaining rows have the following columns: Sex, Country code, Country name, Region code, Region name and then population in each 5-year age group. The order of the rows is important and should be as shown in Box 4, i.e. first the data for males for all the regions then the data on females.

## Mortality data

The input file with mortality data contains data on mortality rates (per thousand population) by 5-year age group for each region in each period. The first two rows contain a description of the contents of the file, the next one contains column headings. The remaining rows have the following columns: Period, Sex, Country code, Country name, Region code, Region name and then mortality rate in each 5-year age group. The order of the data should be as shown in Box 5, i.e. first all the data for the first period, starting with the data for males for all regions then data on females, then all data for the second period in the same order etc.

## Fertility data

The file with fertility data is composed of two parts (see Box 6): (i) data on the shares of males in total births and (ii) fertility rates (per thousand) by 5-year age group. In the first part, the type of data is also specified for each country, through a parameter which can take one of two values: 0 – if default share of males (defined in projection.tsv) should be used, or 2 – if the share of males in total births, as specified for this country explicitly, should be used. In the second part of the file, fertility rates are given for each region and projection period for seven age groups, from 15-19 to 45-49. It is assumed that fertility is zero below 15 years of age and above 49.

The structure of the file is a s follows:
- Two rows with the description of the first part;
- Rows (one row per country) with two data items each: parameter specifying type of data on share of males in total births and a value of the share of males for this country (the latter is only used by MULTIPOLES if the parameter equals 2, but some value must be given in any case);
- An empty row;

- A row with a description of the second part;
- Column header;
- Rows with the following data items: Period, Country code, Country name, Region code, Region name, fertility rate for each of the seven 5-year period. The order of the rows should be as shown in Box 6, i.e. first the data for all the regions for the first period, then the data for all the regions for the second period etc.

### Internal migration – benchmark out-migration rates

Benchmark data on internal migration are prepared in separate files for each country for which data on internal migration are to be used by MULTIPOLES. These files contain benchmark data on out-migration rates (per 1000) for all pairs of regions within a given country by sex and 5-year age group. The first two rows contain a description of the contents of the file, the next one contains column headings. The remaining rows have the following columns: Sex, Origin region code, Origin region name, Destination region code, Destination region name and then out-migration rate for each 5-year age group. The order of the rows should be as shown in Box 7, i.e. first all the data for males, starting with the data on out-migration rates for migration from the first region to all other regions, followed by the data for the second origin region, etc., then all the data for females.

### Internal migration – scenario data

The input file with the scenario data on internal migration contains the values of multipliers which set the level of out-migration rates in each of the 5-year projection periods. The multipliers are provided for each sex and region. In the MULTIPOLES model, these multipliers are applied to the out-migration rates in the previous period, or – for the first period – to the benchmark out-migration rates (specified in the file described in the previous section). In the example file presented in Box 8 the multipliers have been set to 1, which means that the out migration rates would be constant in all the projection periods and equal to the benchmark rates.

The structure of the file is as follows. The first two rows contain a description of the contents of the file, the next one contains column headings. The remaining rows have the following columns: Period, Origin country code, Origin country name, Sex, Origin region code, Origin region name and then multipliers to be applied to the out-migration rates for migration from this origin region to all the regions in the country (so the rows for different various countries differ in their length, depending on the number of the regions). The order of the rows should be as shown in Box 8, i.e. first all the data for the first period, starting with the data for males for the first country, then data on females for the first country, followed by the data for both sexes for the second country, etc, then data for the remaining periods in the same order.

### International migration - benchmark emigration rates

This file contains emigration rates for all regions by sex and 5-year age group. The structure of the file is the same as for the file with initial population stocks. The first two rows contain a description of the contents of the file, the next one contains column headings. The remaining rows have the following columns: Sex, Origin country code, Origin country name, Origin region code, Origin region name and then emigration rate (per 1000) for each 5-year age group. The order of the rows should be as shown in Box 9, i.e. first the data for males for all the regions then the data on females.

Emigration rates given in this file are the rates of emigration to anywhere abroad (so include emigration to other countries within the system and to the rest of the world).

### International migration within the system – scenario data

There are two input files specifying scenario data for international migration within the system. The first file is composed of three parts (see Box 10): (i) the multipliers, (ii) the parameters specifying type of the input data on the geographical distribution of migrants (for migration within the system) and (iii) the distribution of migrants by destination country.

The multipliers provided in the first section set the level of emigration rates in each of the 5-year projection periods and are given for each sex and region. In the MULTIPOLES model, these multipliers are applied to the emigration rates in the previous period, or – for the first period – to the benchmark emigration rates (specified in the file described in the previous section). In the example file presented in Box 10, the multipliers have been set to 1, which means that the emigration rates would be constant in all the projection periods and equal to the benchmark emigration rates.

The parameters specified in the second part can take one of two values: 1 – if the migrants arriving to a given country should be allocated to the destination regions proportionally to region's population, or 2 – if the distribution specified in the file described in Section 11 should be used for the allocation of the migrants to the destination regions.

The third part specifies the distribution of migrants among the individual countries of the system and the rest of the world, in percentages (so the values in each row should sum up to 100). The distributions must be provided for each period, sex and country.

The structure of the file is as follows:
- Two rows with the description of the first part;
- Column headers;
- Rows with the following data items: Sex, Country code, Country name, Region code, Region name, a multiplier for each 5-year period. The order of the rows should be as shown in Box 10, i.e. first the data for all the regions for males, then for females.
- An empty row;
- A row with the description of the second part;
- Rows with the values of the parameter concerning geographical distribution (one country per row);
- An empty row;
- A row with the description of the third part;
- Column headers;
- Rows with the following data items: Period, Sex, Origin country code, Origin country name, percentage of migrants going to each destination country within the system and to the rest of the world. The order of the rows should be as shown in Box 10, i.e. first the data for the first period for males, followed by the data for females, then the data for the second period in the same order, etc.

## International migration within the system – regional distribution scenario data

The regional distribution of immigrants arriving from within the system is defined through percentages of total immigrants to a given country who arrive to each region of the country. These percentages are specified for each sex, period and the destination country for which the value of the "geographical distribution" parameter, set in the input file described in Section 10, is equal to 2. If the parameters are equal 1 for all the countries, the file described in the current section is not needed and the migrants are allocated to the destination regions proportionally to the region's population.

The first two rows contain a description of the contents of the file, the next one contains column headings. The remaining rows have the following columns: Period, Sex, Destination country code, Destination country name, and then the percentage of total immigrant to the country who arrive to each of the country regions (so the rows for different countries differ in the length, depending on the number of the regions). The order of the rows should be as shown in Box 11, i.e. first all the data for the first period, starting with the data for males for all the countries, followed by the data for females, then data for the remaining periods in the same order.

## Immigration from the rest of the world

There is one input file with all the data on immigration from the rest of the world (Box 12). It is composed of four or five parts: (i) annual number of immigrants, by country and period, (ii) share of males by country and period, (iii) age distribution by country and sex (it is assumed to be constant in all projection periods), (iv) parameters specifying the way in which regional distribution of migrants is modelled, (v) regional distribution of immigrants for each country, sex and period.

The age distribution is set in terms of percentage of immigrants in each 5-year age group. The parameters specified in the fourth part can take one of two values: 1 – if the migrants from the rest of the world should be allocated to the destination regions proportionally to region's population, or 2 – if the distribution specified in the fifth part should be used for the allocation of the immigrants to the destination regions. The regional distribution is set in terms of the percentage of immigrants from the rest of the world to a given country who arrive to each region of this country.

The file has the following structure (see Box 12):
- Two rows with the description of the first part;
- Column headers;
- Rows with the data on the number of immigrants from the rest of the world to each country in each period (countries in rows, periods in columns);
- An empty row;
- A row with a description of the second part;
- Column headers;
- Rows with the data on the share of males in the immigration from the rest of the world to each country in each period (countries in rows, periods in columns);
- An empty row;
- A row with a description of the third part;
- Column headers;

- Rows with the following data items each: Sex, Country code, Country name, then percentage of immigrants in each 5-year age group. The rows for males precede those for females;
- An empty row;
- A row with a description of the forth part;
- Rows with the values of the parameters specifying the way of modelling the regional distribution of immigrants from the rest of the world (one row per country).

If the parameter is equal to 2, the fifth part follows:

- A comment row;
- Column headers.

Rows with the following items: Period, Sex, Country code, Country name, then the percentage of immigrants to the country from the rest of the world arriving to each region of this country. The order of the rows is as shown in Box 12, i.e. first all the data for the first period, starting with the data for males for all the countries, followed by the data for females, then data for the remaining periods in the same order.

## Labour force data

The input file with the labour force data contains activity rates (per 100) for each combination of year (in 5-year intervals, from the start year to the end year of the projection), sex, region and 5-year age group. The data must be provided for thirteen age groups, from 15-19 to 75+. It is assumed that labour force participation rates below the age of 15 years are equal to zero.

The first two rows contain a description of the contents of the file, the next one contains column headings. The remaining rows have the following columns: Year, Sex, Country code, Country name, Origin region code, Origin region name and then the activity rates for the sixteen 5-year age groups. The order of the rows should be as shown in Box 13, i.e. first all the data for the first year, starting with the data for males for all regions then data on females, then all data for the second year in the same order etc.

## Box 1. Example of projection.tsv

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Projection for 3 countries for 2005-2050 | | | | | | | | | |
| 3 | | | Number of countries | | | | | | NS |
| 9 | | | Number of projection periods | | | | | | NY |
| 2 | | | Input data option (1-events numbers, 2-age rates, 3-cohort rates) | | | | | | NDATA |
| 2 | | | 1- data on labour force by country; 2-data on labour force by region | | | | | | NDATALF |
| 0 | | | 0 or a parameter for repl. migr. calcs (=1,2,3 or 4) | | | | | | NREPTYPE |
| 1 | | | Separator in the output files: 1-tab, 2-comma,3-semicolon,0-space | | | | | | NSEP |
| 21 | | | Number of period-age groups | | | | | | NA |
| 16 | | | Highest (open-end) age group in labour force data | | | | | | NAL |
| Parameters for dependency ratio calcs, eg 4 and 14 correspond to ages 15 and 65 | | | | | | | | | IA1,IA2,IA3 |
| 4 | 14 | 16 | | | | | | | |
| 0.515 | | | Default proportion of male births | | | | | | SEXR(1) |
| 7 | | | Default RC schedule (7, 9 or 11) | | | | | | DEFSCH |
| Parameters of the default Rogers-Castro schedule | | | | | | | | | DEFP |
| 0.01 | 0.1 | 0.06 | 20 | 0.1 | 0.4 | 0.003 | 0 | 0 | 0 |
| Projection year labels | | | | | | | | | YEAR |
| 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
| Projection year short labels | | | | | | | | | YEAR2 |
| 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| Projection period labels | | | | | | | | | PERIOD |
| 2005-2010 | 2010-2015 | 2015-2020 | 2020-2025 | 2025-2030 | 2030-2035 | 2035-2040 | 2040-2045 | 2045-2050 | |
| countries3.tsv | | | File with region's names and ids | | | | | | INREG |
| pop.tsv | | | File with start population stocks | | | | | | INPOP |
| 0 | | | File with popn stocks (mid-year), births and deaths | | | | | | INMAIN |
| fert_2.tsv | | | File with fertility rates | | | | | | INFERT |
| mort_2.tsv | | | File with mortality rates | | | | | | INMORT |
| irm_FI_rates.tsv | | | File with internal migrn for country 1 | | | | | | INIRM(1) |
| 0 | | | File with internal migrn for country 2 | | | | | | INIRM(2) |
| irm_NO_rates.tsv | | | File with internal migrn for country 3 | | | | | | INIRM(3) |
| ism_rates.tsv | | | File with international migration data | | | | | | INISM |
| 0 | | | File with propn of males in internatl migr | | | | | | INISMSEX |
| 0 | | | File with age struct of intl migr.(rates per 1000) | | | | | | INISMDIS |
| 0 | | | File with TFR changes scenario | | | | | | INTFRSC |
| 0 | | | File with life expectancy changes scenario | | | | | | INLESC |
| irm_scenario_2.tsv | | | File with internal migration scenario | | | | | | INIRMSC |
| ism_scenario_2_a.tsv | | | File with international migration scenario | | | | | | INISMSC |
| ism_scenario_2_reg_a.tsv | | | File with int. migr. scenario - regional distribution | | | | | | INISMREG |
| extmigr_2_b.tsv | | | File with external net migration scenario | | | | | | INEXTM |
| labour_rates_2.tsv | | | File with labor force participation rates | | | | | | INBLF |
| 0 | | | File with LF participation scenario | | | | | | INLFSC |
| 0 | | | File with age and sex structure of replacement migrants | | | | | | INREP |
| res3 | | | Output file (without extension) | | | | | | OUTFILE |
| typology.tsv | | | File with typology of regions | | | | | | INTYPES |

**Box 2. Example of a list of countries and regions**

| Country code | Country name | Number of regions |
|---|---|---|
| FI | Finland | 5 |
| LV | Latvia | 1 |
| NO | Norway | 7 |

| Country code | Region code | Region name |
|---|---|---|
| FI | FI13 | Itä-Suomi |
| FI | FI18 | Etelä-Suomi |
| FI | FI19 | Länsi-Suomi |
| FI | FI1A | Pohjois-Suomi |
| FI | FI20 | Åland |
| LV | LV00 | Latvia |
| NO | NO01 | Oslo_og_Akershus |
| NO | NO02 | Hedmark_og_Oppland |
| NO | NO03 | Sør-Østlandet |
| NO | NO04 | Agder_og_Rogaland |
| NO | NO05 | Vestlandet |
| NO | NO06 | Trøndelag |
| NO | NO07 | Nord-Norge |

**Box 3. Example of a file with region typology**

Typology of regions

| 5 | Number of types | | |
|---|---|---|---|
| Country_code | Region_code | Region_name | Region Type |
| FI | FI13 | Itä-Suomi | 5 |
| FI | FI18 | Etelä-Suomi | 3 |
| FI | FI19 | Länsi-Suomi | 1 |
| FI | FI1A | Pohjois-Suomi | 3 |
| FI | FI20 | Åland | 1 |
| LV | LV00 | Latvia | 5 |
| NO | NO01 | Oslo_og_Akershus | 3 |
| NO | NO02 | Hedmark_og_Oppland | 1 |
| NO | NO03 | Sør-Østlandet | 1 |
| NO | NO04 | Agder_og_Rogaland | 3 |
| NO | NO05 | Vestlandet | 3 |
| NO | NO06 | Trøndelag | 3 |
| NO | NO07 | Nord-Norge | 3 |

## Box 4. Example of initial population stocks data

| Sex | Country co | Country na | Region coc | Region nar | 4 | 9 | 14 | 19 | 24 | 29 | 34 | 39 | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 79 | 84 | 89 | 94 | 99 | 100+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Males | FI | Finland | FI13 | Itä-Suomi | 16023 | 18061 | 21087 | 22203 | 20748 | 17382 | 15726 | 20293 | 24682 | 27417 | 29167 | 27848 | 18234 | 16960 | 14016 | 10973 | 5627 | 2121 | 689 | 111 | 11 |
| Males | FI | Finland | FI18 | Etelä-Suon | 72074 | 75086 | 81779 | 75139 | 81013 | 87802 | 83516 | 95900 | 97328 | 93021 | 93440 | 100656 | 64408 | 51933 | 39762 | 29914 | 16526 | 6443 | 2117 | 353 | 15 |
| Males | FI | Finland | FI19 | Länsi-Suor | 36356 | 38236 | 42546 | 41665 | 44981 | 42575 | 38483 | 44018 | 46850 | 47836 | 50925 | 53198 | 34407 | 30626 | 25048 | 19283 | 11201 | 4311 | 1441 | 206 | 13 |
| Males | FI | Finland | FI1A | Pohjois-Su | 20116 | 20509 | 22590 | 22721 | 23048 | 20772 | 18051 | 20619 | 22866 | 24020 | 24859 | 23035 | 14886 | 13733 | 10853 | 8141 | 4267 | 1500 | 519 | 56 | 5 |
| Males | FI | Finland | FI20 | Åland | 719 | 819 | 879 | 846 | 704 | 763 | 829 | 961 | 942 | 891 | 985 | 1055 | 825 | 575 | 471 | 397 | 263 | 125 | 45 | 8 | 0 |
| Males | LV | Latvia | LV00 | Latvia | 51468 | 49298 | 73795 | 94359 | 89057 | 80340 | 81390 | 77119 | 83335 | 79846 | 67472 | 56730 | 54232 | 49735 | 35501 | 23934 | 9994 | 3432 | 1532 | 312 | 37 |
| Males | NO | Norway | NO01 | Oslo_og_A | 35263 | 33159 | 32258 | 28864 | 28241 | 37893 | 46489 | 44763 | 40027 | 35753 | 31102 | 31945 | 23140 | 15663 | 13163 | 11416 | 8607 | 3619 | 1102 | 179 | 20 |
| Males | NO | Norway | NO02 | Hedmark_( | 10160 | 11894 | 12452 | 11539 | 10406 | 9865 | 11953 | 13699 | 12912 | 13313 | 12875 | 13670 | 10038 | 7760 | 7179 | 6358 | 4838 | 2098 | 671 | 110 | 7 |
| Males | NO | Norway | NO03 | Sør-Østlan | 26551 | 29377 | 30489 | 28584 | 25667 | 25191 | 30755 | 33950 | 32000 | 31498 | 30341 | 31416 | 22577 | 17144 | 14517 | 12761 | 9323 | 4112 | 1227 | 177 | 16 |
| Males | NO | Norway | NO04 | Agder_og_ | 22371 | 24720 | 25234 | 23221 | 22072 | 21625 | 24153 | 25396 | 23688 | 22596 | 21405 | 19983 | 14690 | 11001 | 9190 | 7472 | 5661 | 2729 | 809 | 141 | 10 |
| Males | NO | Norway | NO05 | Vestlandet | 26399 | 28242 | 29170 | 27473 | 25910 | 24958 | 28483 | 29872 | 28277 | 27833 | 26765 | 26178 | 18853 | 14265 | 12594 | 10683 | 8174 | 4014 | 1268 | 218 | 23 |
| Males | NO | Norway | NO06 | Trøndelag | 12900 | 13876 | 14238 | 13034 | 12375 | 12861 | 14579 | 15448 | 14209 | 13986 | 13268 | 13193 | 10199 | 7088 | 6248 | 5613 | 4034 | 1820 | 553 | 81 | 4 |
| Males | NO | Norway | NO07 | Nord-Norg( | 14108 | 16314 | 17068 | 15640 | 14384 | 13612 | 16232 | 18029 | 16543 | 16228 | 16293 | 16235 | 12193 | 9069 | 7558 | 6159 | 4264 | 1865 | 605 | 106 | 3 |
| Females | FI | Finland | FI13 | Itä-Suomi | 15373 | 17488 | 20382 | 20875 | 18832 | 15544 | 15185 | 19521 | 23574 | 25643 | 26160 | 26014 | 18635 | 19005 | 17703 | 16934 | 12155 | 5848 | 2334 | 441 | 31 |
| Females | FI | Finland | FI18 | Etelä-Suon | 69139 | 72517 | 78716 | 72598 | 81036 | 87771 | 81874 | 94541 | 95761 | 93405 | 98625 | 105455 | 70250 | 61126 | 53504 | 48823 | 37495 | 19506 | 8517 | 1762 | 155 |
| Females | FI | Finland | FI19 | Länsi-Suor | 34362 | 36433 | 40682 | 39667 | 41854 | 39114 | 35590 | 41483 | 44834 | 46528 | 49417 | 52077 | 35744 | 34820 | 31476 | 30407 | 23649 | 11955 | 4983 | 997 | 94 |
| Females | FI | Finland | FI1A | Pohjois-Su | 18874 | 19503 | 21919 | 21627 | 20536 | 18410 | 16285 | 18975 | 21701 | 23000 | 22853 | 21951 | 15018 | 14793 | 13005 | 11721 | 8601 | 3971 | 1636 | 286 | 22 |
| Females | FI | Finland | FI20 | Åland | 657 | 782 | 853 | 764 | 612 | 720 | 815 | 1005 | 928 | 963 | 1062 | 1038 | 702 | 618 | 498 | 504 | 459 | 264 | 149 | 30 | 5 |
| Females | LV | Latvia | LV00 | Latvia | 49096 | 46498 | 71260 | 90157 | 86029 | 78447 | 80792 | 79065 | 88826 | 88447 | 79724 | 72379 | 76097 | 78546 | 65529 | 57643 | 34905 | 12446 | 6237 | 1247 | 146 |
| Females | NO | Norway | NO01 | Oslo_og_A | 33975 | 31229 | 30547 | 27604 | 29600 | 40762 | 46108 | 43182 | 38479 | 34600 | 31148 | 31937 | 23600 | 17963 | 16666 | 15783 | 14912 | 8718 | 3681 | 809 | 95 |
| Females | NO | Norway | NO02 | Hedmark_( | 9880 | 11041 | 11872 | 10864 | 9736 | 9207 | 11805 | 13006 | 12757 | 13075 | 12707 | 13466 | 10360 | 8355 | 8008 | 8242 | 7493 | 3945 | 1606 | 299 | 29 |
| Females | NO | Norway | NO03 | Sør-Østlan | 25004 | 28054 | 29032 | 27263 | 24736 | 24738 | 30535 | 33319 | 31262 | 31393 | 29989 | 31138 | 23126 | 19073 | 17063 | 16515 | 15634 | 9089 | 3619 | 720 | 83 |
| Females | NO | Norway | NO04 | Agder_og_ | 21567 | 23617 | 23777 | 21989 | 20935 | 20731 | 23364 | 24355 | 22804 | 21997 | 20229 | 19122 | 14964 | 11610 | 10565 | 10065 | 9458 | 5712 | 2340 | 544 | 64 |
| Females | NO | Norway | NO05 | Vestlandet | 25339 | 26883 | 27617 | 25722 | 24589 | 23971 | 27017 | 28252 | 26256 | 26535 | 25221 | 24537 | 18520 | 15122 | 14566 | 14169 | 13285 | 8336 | 3531 | 848 | 96 |
| Females | NO | Norway | NO06 | Trøndelag | 12162 | 13178 | 13705 | 12693 | 12013 | 12080 | 13974 | 14941 | 13581 | 13291 | 12902 | 12793 | 9948 | 7655 | 7176 | 7146 | 6418 | 3849 | 1526 | 344 | 29 |
| Females | NO | Norway | NO07 | Nord-Norg( | 13467 | 15354 | 15775 | 14553 | 13242 | 12759 | 15949 | 16916 | 15883 | 15551 | 14905 | 14893 | 11408 | 9232 | 8452 | 8238 | 7157 | 4268 | 1705 | 383 | 42 |

## Box 5. Example of mortality data

Mortality data

Period-age mortality rates (per 1000) - annual averages

| Period | Sex | Country co | Country na | Region coc | Region nar | 4 | 9 | 14 | 19 | 24 | 29 | 34 | 39 | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 79 | 84 | 89 | 94 | 99 | 100+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2005-2010 | Males | FI | Finland | FI13 | Itä-Suomi | 1.10071 | 0.17159 | 0.21031 | 0.76046 | 1.28538 | 1.21979 | 1.45458 | 2.15089 | 3.11242 | 5.05426 | 7.69170 | 10.73301 | 16.33877 | 22.09199 | 35.09947 | 55.79066 | 92.79709 | 157.44464 | 256.21332 | 303.50862 | 309.84787 |
| 2005-2010 | Males | FI | Finland | FI18 | Etelä-Suon | 0.81975 | 0.12977 | 0.15629 | 0.56887 | 0.95935 | 0.90740 | 1.08961 | 1.60738 | 2.44287 | 4.38550 | 6.64373 | 9.83968 | 13.88867 | 20.56296 | 32.66675 | 55.44952 | 93.36857 | 152.51290 | 263.57170 | 303.50862 | 309.84787 |
| 2005-2010 | Males | FI | Finland | FI19 | Länsi-Suor | 0.94906 | 0.14875 | 0.18186 | 0.65844 | 1.11096 | 1.05292 | 1.25869 | 1.85828 | 2.60036 | 4.02310 | 6.25029 | 8.97096 | 12.30160 | 19.39806 | 31.63517 | 55.05929 | 88.84652 | 147.14635 | 256.63461 | 303.50862 | 309.84787 |
| 2005-2010 | Males | FI | Finland | FI1A | Pohjois-Su | 0.92514 | 0.14316 | 0.17909 | 0.64850 | 1.09092 | 1.03238 | 1.23058 | 1.81380 | 3.09529 | 4.33008 | 6.70659 | 10.00804 | 14.28097 | 19.34467 | 33.47226 | 54.92027 | 94.43435 | 156.19898 | 232.34218 | 303.50862 | 309.84787 |
| 2005-2010 | Males | FI | Finland | FI20 | Åland | 0.81549 | 0.10841 | 0.11725 | 0.38952 | 0.73396 | 0.66956 | 0.62469 | 0.89328 | 1.41730 | 2.29677 | 3.82419 | 6.11462 | 9.78841 | 16.90828 | 28.71410 | 48.81914 | 87.96489 | 154.74825 | 256.44039 | 303.50862 | 309.84787 |
| 2005-2010 | Males | LV | Latvia | LV00 | Latvia | 2.40673 | 0.42868 | 0.34415 | 0.88359 | 1.82935 | 2.40571 | 3.51271 | 5.33144 | 7.77173 | 11.36465 | 17.41829 | 24.20219 | 34.57398 | 45.14680 | 63.92157 | 86.95445 | 125.43514 | 179.68878 | 265.85545 | 303.50862 | 309.84787 |
| 2005-2010 | Males | NO | Norway | NO01 | Oslo_og_A | 0.85634 | 0.10867 | 0.12776 | 0.52817 | 0.91716 | 0.91360 | 0.90944 | 1.13756 | 1.47829 | 2.32707 | 3.96438 | 6.35610 | 9.98863 | 17.25245 | 28.80319 | 50.54324 | 87.69442 | 159.34957 | 259.06274 | 303.50862 | 309.84787 |
| 2005-2010 | Males | NO | Norway | NO02 | Hedmark_( | 0.94151 | 0.12049 | 0.14220 | 0.58357 | 1.00787 | 1.00406 | 1.00273 | 1.25303 | 1.63265 | 2.56264 | 4.05766 | 6.73544 | 11.73198 | 18.03445 | 30.13027 | 51.26359 | 96.20963 | 161.43970 | 256.90858 | 303.50862 | 309.84787 |
| 2005-2010 | Males | NO | Norway | NO03 | Sør-Østlan | 0.99957 | 0.12883 | 0.14973 | 0.61036 | 1.06765 | 1.06016 | 1.06047 | 1.32703 | 1.71695 | 2.71833 | 4.46030 | 6.97439 | 10.65039 | 18.26712 | 31.64317 | 51.42289 | 93.02278 | 159.36958 | 255.47165 | 303.50862 | 309.84787 |
| 2005-2010 | Males | NO | Norway | NO04 | Agder_og_ | 0.90637 | 0.11709 | 0.13725 | 0.55849 | 0.96588 | 0.96297 | 0.96546 | 1.20409 | 1.56485 | 2.46682 | 3.87557 | 6.21736 | 10.51318 | 17.73435 | 28.31311 | 47.57703 | 87.49767 | 148.09480 | 261.50364 | 303.50862 | 309.84787 |
| 2005-2010 | Males | NO | Norway | NO05 | Vestlandet | 0.81510 | 0.10505 | 0.12267 | 0.50023 | 0.87621 | 0.86608 | 0.86488 | 1.08659 | 1.40926 | 2.22049 | 3.34018 | 5.32225 | 9.36552 | 16.66127 | 26.65540 | 46.29541 | 84.72050 | 143.94523 | 254.70633 | 303.50862 | 309.84787 |
| 2005-2010 | Males | NO | Norway | NO06 | Trøndelag | 0.73186 | 0.09480 | 0.11103 | 0.45070 | 0.77946 | 0.77698 | 0.77978 | 0.97230 | 1.26336 | 1.99232 | 3.71311 | 5.92621 | 9.61814 | 15.11148 | 29.71501 | 49.43483 | 95.42900 | 165.09796 | 259.84919 | 303.50862 | 309.84787 |
| 2005-2010 | Males | NO | Norway | NO07 | Nord-Norg( | 1.00395 | 0.12555 | 0.14749 | 0.61771 | 1.07846 | 1.07371 | 1.06270 | 1.33213 | 1.72836 | 2.72335 | 4.46139 | 6.80826 | 10.69306 | 18.59315 | 30.79168 | 54.34305 | 100.85922 | 159.05879 | 247.38902 | 303.50862 | 309.84787 |
| 2005-2010 | Females | FI | Finland | FI13 | Itä-Suomi | 0.78489 | 0.14817 | 0.12223 | 0.30140 | 0.38923 | 0.40459 | 0.49677 | 0.81582 | 1.36231 | 2.01765 | 2.98776 | 4.39362 | 6.10746 | 8.36868 | 16.41499 | 30.01694 | 63.52481 | 122.79622 | 217.71286 | 302.72014 | 315.90342 |
| 2005-2010 | Females | FI | Finland | FI18 | Etelä-Suon | 0.67567 | 0.13186 | 0.10873 | 0.26204 | 0.33403 | 0.34782 | 0.42773 | 0.70859 | 1.16980 | 1.94594 | 3.12496 | 4.41498 | 5.95860 | 9.28285 | 15.97792 | 29.52028 | 58.76927 | 112.88305 | 205.48813 | 302.72014 | 315.90342 |
| 2005-2010 | Females | FI | Finland | FI19 | Länsi-Suor | 0.66248 | 0.13021 | 0.10676 | 0.25546 | 0.32569 | 0.33650 | 0.42097 | 0.69237 | 1.13999 | 1.82717 | 2.86453 | 3.67873 | 5.78167 | 8.36483 | 14.74924 | 27.92628 | 57.15280 | 111.67659 | 204.06229 | 302.72014 | 315.90342 |
| 2005-2010 | Females | FI | Finland | FI1A | Pohjois-Su | 0.61604 | 0.11801 | 0.09784 | 0.23698 | 0.30618 | 0.31762 | 0.38876 | 0.64197 | 1.06493 | 1.56822 | 2.74100 | 4.10942 | 5.49751 | 9.43773 | 15.33115 | 31.16167 | 60.69654 | 116.69477 | 200.62549 | 302.72014 | 315.90342 |
| 2005-2010 | Females | FI | Finland | FI20 | Åland | 0.65006 | 0.07257 | 0.07921 | 0.21815 | 0.25674 | 0.26190 | 0.35213 | 0.50979 | 0.79978 | 1.40905 | 2.40001 | 3.84144 | 6.07593 | 9.45007 | 15.99761 | 28.25981 | 54.35329 | 104.32621 | 191.07776 | 302.72014 | 315.90342 |
| 2005-2010 | Females | LV | Latvia | LV00 | Latvia | 2.06567 | 0.24231 | 0.15826 | 0.44386 | 0.48935 | 0.64836 | 0.99661 | 1.58912 | 2.41079 | 3.98166 | 5.95204 | 8.63224 | 12.39563 | 17.28458 | 29.44810 | 50.85407 | 90.75738 | 153.86227 | 235.10522 | 302.72014 | 315.90342 |
| 2005-2010 | Females | NO | Norway | NO01 | Oslo_og_A | 0.71860 | 0.10826 | 0.09659 | 0.25480 | 0.34035 | 0.35883 | 0.43746 | 0.63390 | 1.01863 | 1.67076 | 2.58687 | 4.62512 | 6.52561 | 9.67721 | 17.25351 | 32.46154 | 56.83920 | 109.39972 | 201.75493 | 302.72014 | 315.90342 |
| 2005-2010 | Females | NO | Norway | NO02 | Hedmark_( | 0.77931 | 0.11492 | 0.10953 | 0.27565 | 0.36778 | 0.39084 | 0.47042 | 0.68160 | 1.10342 | 1.78983 | 2.78216 | 4.49904 | 6.79541 | 10.38821 | 19.10733 | 30.72143 | 61.45076 | 122.53436 | 221.60498 | 302.72014 | 315.90342 |
| 2005-2010 | Females | NO | Norway | NO03 | Sør-Østlan | 0.76303 | 0.11770 | 0.10213 | 0.27211 | 0.36252 | 0.38294 | 0.46810 | 0.67899 | 1.08098 | 1.79158 | 2.76282 | 4.33226 | 6.40885 | 10.14096 | 17.17463 | 31.20096 | 59.85961 | 113.54337 | 201.57779 | 302.72014 | 315.90342 |
| 2005-2010 | Females | NO | Norway | NO04 | Agder_og_ | 0.74891 | 0.11518 | 0.10020 | 0.26665 | 0.35308 | 0.37408 | 0.45725 | 0.66085 | 1.05862 | 1.75094 | 2.69607 | 4.27683 | 6.86421 | 10.20498 | 15.94953 | 29.45433 | 54.82997 | 105.99906 | 199.72468 | 302.72014 | 315.90342 |
| 2005-2010 | Females | NO | Norway | NO05 | Vestlandet | 0.64466 | 0.09867 | 0.08446 | 0.22899 | 0.30447 | 0.32055 | 0.39370 | 0.56918 | 0.91273 | 1.50805 | 2.32493 | 3.58333 | 5.34997 | 8.05511 | 13.52651 | 26.54349 | 50.88432 | 100.79174 | 183.39720 | 302.72014 | 315.90342 |
| 2005-2010 | Females | NO | Norway | NO06 | Trøndelag | 0.67107 | 0.10303 | 0.08807 | 0.23866 | 0.31797 | 0.33458 | 0.41082 | 0.59485 | 0.95083 | 1.57347 | 2.42646 | 3.88572 | 6.00716 | 9.43345 | 17.09336 | 30.85385 | 58.24067 | 113.70628 | 207.55412 | 302.72014 | 315.90342 |
| 2005-2010 | Females | NO | Norway | NO07 | Nord-Norg( | 0.66649 | 0.10250 | 0.08780 | 0.23721 | 0.31594 | 0.33276 | 0.40826 | 0.59132 | 0.94424 | 1.56358 | 2.41075 | 3.73696 | 6.84243 | 10.12453 | 17.47895 | 32.48766 | 57.66492 | 114.91320 | 203.74522 | 302.72014 | 315.90342 |
| 2010-2015 | Males | FI | Finland | FI13 | Itä-Suomi | 1.10071 | 0.17159 | 0.21031 | 0.76046 | 1.28538 | 1.21979 | 1.45458 | 2.15089 | 3.11242 | 5.05426 | 7.69170 | 10.73301 | 16.33877 | 22.09199 | 35.09947 | 55.79066 | 92.79709 | 157.44464 | 256.21332 | 303.50862 | 309.84787 |
| 2010-2015 | Males | FI | Finland | FI18 | Etelä-Suon | 0.81975 | 0.12977 | 0.15629 | 0.56887 | 0.95935 | 0.90740 | 1.08961 | 1.60738 | 2.44287 | 4.38550 | 6.64373 | 9.83968 | 13.88867 | 20.56296 | 32.66675 | 55.44952 | 93.36857 | 152.51290 | 263.57170 | 303.50862 | 309.84787 |
| 2010-2015 | Males | FI | Finland | FI19 | Länsi-Suor | 0.94906 | 0.14875 | 0.18186 | 0.65844 | 1.11096 | 1.05292 | 1.25869 | 1.85828 | 2.60036 | 4.02310 | 6.25029 | 8.97096 | 12.30160 | 19.39806 | 31.63517 | 55.05929 | 88.84652 | 147.14635 | 256.63461 | 303.50862 | 309.84787 |
| 2010-2015 | Males | FI | Finland | FI1A | Pohjois-Su | 0.92514 | 0.14316 | 0.17909 | 0.64850 | 1.09092 | 1.03238 | 1.23058 | 1.81380 | 3.09529 | 4.33008 | 6.70659 | 10.00804 | 14.28097 | 19.34467 | 33.47226 | 54.92027 | 94.43435 | 156.19898 | 232.34218 | 303.50862 | 309.84787 |
| 2010-2015 | Males | FI | Finland | FI20 | Åland | 0.81549 | 0.10841 | 0.11725 | 0.38952 | 0.73396 | 0.66956 | 0.62469 | 0.89328 | 1.41730 | 2.29677 | 3.82419 | 6.11462 | 9.78841 | 16.90828 | 28.71410 | 48.81914 | 87.96489 | 154.74825 | 256.44039 | 303.50862 | 309.84787 |
| 2010-2015 | Males | LV | Latvia | LV00 | Latvia | 2.40673 | 0.42868 | 0.34415 | 0.88359 | 1.82935 | 2.40571 | 3.51271 | 5.33144 | 7.77173 | 11.36465 | 17.41829 | 24.20219 | 34.57398 | 45.14680 | 63.92157 | 86.95445 | 125.43514 | 179.68878 | 265.85545 | 303.50862 | 309.84787 |
| 2010-2015 | Males | NO | Norway | NO01 | Oslo_og_A | 0.85634 | 0.10867 | 0.12776 | 0.52817 | 0.91716 | 0.91360 | 0.90944 | 1.13756 | 1.47829 | 2.32707 | 3.96438 | 6.35610 | 9.98863 | 17.25245 | 28.80319 | 50.54324 | 87.69442 | 159.34957 | 259.06274 | 303.50862 | 309.84787 |
| 2010-2015 | Males | NO | Norway | NO02 | Hedmark_( | 0.94151 | 0.12049 | 0.14220 | 0.58357 | 1.00787 | 1.00406 | 1.00273 | 1.25303 | 1.63265 | 2.56264 | 4.05766 | 6.73544 | 11.73198 | 18.03445 | 30.13027 | 51.26359 | 96.20963 | 161.43970 | 256.90858 | 303.50862 | 309.84787 |
| 2010-2015 | Males | NO | Norway | NO03 | Sør-Østlan | 0.99957 | 0.12883 | 0.14973 | 0.61036 | 1.06765 | 1.06016 | 1.06047 | 1.32703 | 1.71695 | 2.71833 | 4.46030 | 6.97439 | 10.65039 | 18.26712 | 31.64317 | 51.42289 | 93.02278 | 159.36958 | 255.47165 | 303.50862 | 309.84787 |
| 2010-2015 | Males | NO | Norway | NO04 | Agder_og_ | 0.90637 | 0.11709 | 0.13725 | 0.55849 | 0.96588 | 0.96297 | 0.96546 | 1.20409 | 1.56485 | 2.46682 | 3.87557 | 6.21736 | 10.51318 | 17.73435 | 28.31311 | 47.57703 | 87.49767 | 148.09480 | 261.50364 | 303.50862 | 309.84787 |
| 2010-2015 | Males | NO | Norway | NO05 | Vestlandet | 0.81510 | 0.10505 | 0.12267 | 0.50023 | 0.87621 | 0.86608 | 0.86488 | 1.08659 | 1.40926 | 2.22049 | 3.34018 | 5.32225 | 9.36552 | 16.66127 | 26.65540 | 46.29541 | 84.72050 | 143.94523 | 254.70633 | 303.50862 | 309.84787 |
| 2010-2015 | Males | NO | Norway | NO06 | Trøndelag | 0.73186 | 0.09480 | 0.11103 | 0.45070 | 0.77946 | 0.77698 | 0.77978 | 0.97230 | 1.26336 | 1.99232 | 3.71311 | 5.92621 | 9.61814 | 15.11148 | 29.71501 | 49.43483 | 95.42900 | 165.09796 | 259.84919 | 303.50862 | 309.84787 |
| 2010-2015 | Males | NO | Norway | NO07 | Nord-Norg( | 1.00395 | 0.12555 | 0.14749 | 0.61771 | 1.07846 | 1.07371 | 1.06270 | 1.33213 | 1.72836 | 2.72335 | 4.46139 | 6.80826 | 10.69306 | 18.59315 | 30.79168 | 54.34305 | 100.85922 | 159.05879 | 247.38902 | 303.50862 | 309.84787 |
| 2010-2015 | Females | FI | Finland | FI13 | Itä-Suomi | 0.78489 | 0.14817 | 0.12223 | 0.30140 | 0.38923 | 0.40459 | 0.49677 | 0.81582 | 1.36231 | 2.01765 | 2.98776 | 4.39362 | 6.10746 | 8.36868 | 16.41499 | 30.01694 | 63.52481 | 122.79622 | 217.71286 | 302.72014 | 315.90342 |
| 2010-2015 | Females | FI | Finland | FI18 | Etelä-Suon | 0.67567 | 0.13186 | 0.10873 | 0.26204 | 0.33403 | 0.34782 | 0.42773 | 0.70859 | 1.16980 | 1.94594 | 3.12496 | 4.41498 | 5.95860 | 9.28285 | 15.97792 | 29.52028 | 58.76927 | 112.88305 | 205.48813 | 302.72014 | 315.90342 |
| 2010-2015 | Females | FI | Finland | FI19 | Länsi-Suor | 0.66248 | 0.13021 | 0.10676 | 0.25546 | 0.32569 | 0.33650 | 0.42097 | 0.69237 | 1.13999 | 1.82717 | 2.86453 | 3.67873 | 5.78167 | 8.36483 | 14.74924 | 27.92628 | 57.15280 | 111.67659 | 204.06229 | 302.72014 | 315.90342 |
| 2010-2015 | Females | FI | Finland | FI1A | Pohjois-Su | 0.61604 | 0.11801 | 0.09784 | 0.23698 | 0.30618 | 0.31762 | 0.38876 | 0.64197 | 1.06493 | 1.56822 | 2.74100 | 4.10942 | 5.49751 | 9.43773 | 15.33115 | 31.16167 | 60.69654 | 116.69477 | 200.62549 | 302.72014 | 315.90342 |
| 2010-2015 | Females | FI | Finland | FI20 | Åland | 0.65006 | 0.07257 | 0.07921 | 0.21815 | 0.25674 | 0.26190 | 0.35213 | 0.50979 | 0.79978 | 1.40905 | 2.40001 | 3.84144 | 6.07593 | 9.45007 | 15.99761 | 28.25981 | 54.35329 | 104.32621 | 191.07776 | 302.72014 | 315.90342 |
| 2010-2015 | Females | LV | Latvia | LV00 | Latvia | 2.06567 | 0.24231 | 0.15826 | 0.44386 | 0.48935 | 0.64836 | 0.99661 | 1.58912 | 2.41079 | 3.98166 | 5.95204 | 8.63224 | 12.39563 | 17.28458 | 29.44810 | 50.85407 | 90.75738 | 153.86227 | 235.10522 | 302.72014 | 315.90342 |
| 2010-2015 | Females | NO | Norway | NO01 | Oslo_og_A | 0.71860 | 0.10826 | 0.09659 | 0.25480 | 0.34035 | 0.35883 | 0.43746 | 0.63390 | 1.01863 | 1.67076 | 2.58687 | 4.62512 | 6.52561 | 9.67721 | 17.25351 | 32.46154 | 56.83920 | 109.39972 | 201.75493 | 302.72014 | 315.90342 |
| 2010-2015 | Females | NO | Norway | NO02 | Hedmark_( | 0.77931 | 0.11492 | 0.10953 | 0.27565 | 0.36778 | 0.39084 | 0.47042 | 0.68160 | 1.10342 | 1.78983 | 2.78216 | 4.49904 | 6.79541 | 10.38821 | 19.10733 | 30.72143 | 61.45076 | 122.53436 | 221.60498 | 302.72014 | 315.90342 |
| 2010-2015 | Females | NO | Norway | NO03 | Sør-Østlan | 0.76303 | 0.11770 | 0.10213 | 0.27211 | 0.36252 | 0.38294 | 0.46810 | 0.67899 | 1.08098 | 1.79158 | 2.76282 | 4.33226 | 6.40885 | 10.14096 | 17.17463 | 31.20096 | 59.85961 | 113.54337 | 201.57779 | 302.72014 | 315.90342 |
| 2010-2015 | Females | NO | Norway | NO04 | Agder_og_ | 0.74891 | 0.11518 | 0.10020 | 0.26665 | 0.35308 | 0.37408 | 0.45725 | 0.66085 | 1.05862 | 1.75094 | 2.69607 | 4.27683 | 6.86421 | 10.20498 | 15.94953 | 29.45433 | 54.82997 | 105.99906 | 199.72468 | 302.72014 | 315.90342 |
| 2010-2015 | Females | NO | Norway | NO05 | Vestlandet | 0.64466 | 0.09867 | 0.08446 | 0.22899 | 0.30447 | 0.32055 | 0.39370 | 0.56918 | 0.91273 | 1.50805 | 2.32493 | 3.58333 | 5.34997 | 8.05511 | 13.52651 | 26.54349 | 50.88432 | 100.79174 | 183.39720 | 302.72014 | 315.90342 |
| 2010-2015 | Females | NO | Norway | NO06 | Trøndelag | 0.67107 | 0.10303 | 0.08807 | 0.23866 | 0.31797 | 0.33458 | 0.41082 | 0.59485 | 0.95083 | 1.57347 | 2.42646 | 3.88572 | 6.00716 | 9.43345 | 17.09336 | 30.85385 | 58.24067 | 113.70628 | 207.55412 | 302.72014 | 315.90342 |
| 2010-2015 | Females | NO | Norway | NO07 | Nord-Norg( | 0.66649 | 0.10250 | 0.08780 | 0.23721 | 0.31594 | 0.33276 | 0.40826 | 0.59132 | 0.94424 | 1.56358 | 2.41075 | 3.73696 | 6.84243 | 10.12453 | 17.47895 | 32.48766 | 57.66492 | 114.91320 | 203.74522 | 302.72014 | 315.90342 |

## Box 6. Example of fertility data

Fertility data

Share of males in births

| | | | |
|---|---|---|---|
| 2 | 0.515 | Finland | 0 - use default shares; 2 - use share of males specified for this country |
| 2 | 0.515 | Latvia | |
| 2 | 0.515 | Norway | |

Period-age fertility rates (per 1000)

| Period | Country co | Country na | Region coc | Region nar | 19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | TFR (not u |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2005-2010 | FI | Finland | FI13 | Itä-Suomi | 8.436 | 58.876 | 118.441 | 105.473 | 47.962 | 10.281 | 0.828 | 1.75 |
| 2005-2010 | FI | Finland | FI18 | Etelä-Suon | 6.211 | 42.052 | 92.676 | 110.745 | 53.85 | 13.574 | 0.688 | 1.6 |
| 2005-2010 | FI | Finland | FI19 | Länsi-Suor | 6.543 | 51.075 | 115.603 | 117.262 | 52.406 | 11.127 | 0.684 | 1.77 |
| 2005-2010 | FI | Finland | FI1A | Pohjois-Su | 8.561 | 76.021 | 137.624 | 126.488 | 60.122 | 16.064 | 0.755 | 2.13 |
| 2005-2010 | FI | Finland | FI20 | Åland | 1.226 | 56.142 | 90.507 | 110.212 | 50.143 | 15.329 | 1.982 | 1.63 |
| 2005-2010 | LV | Latvia | LV00 | Latvia | 15.645 | 62.541 | 78.961 | 56.513 | 26.335 | 5.572 | 0.433 | 1.23 |
| 2005-2010 | NO | Norway | NO01 | Oslo_og_A | 3.113 | 37.271 | 91.17 | 128.607 | 65.847 | 14.577 | 0.713 | 1.71 |
| 2005-2010 | NO | Norway | NO02 | Hedmark_( | 4.702 | 45.649 | 113.029 | 104.877 | 43.737 | 8.08 | 0.295 | 1.6 |
| 2005-2010 | NO | Norway | NO03 | Sør-Østlan | 4.92 | 48.247 | 116.31 | 109.098 | 41.983 | 8.669 | 0.367 | 1.65 |
| 2005-2010 | NO | Norway | NO04 | Agder_og_ | 6.491 | 56.988 | 133.431 | 115.455 | 48.709 | 8.348 | 0.567 | 1.85 |
| 2005-2010 | NO | Norway | NO05 | Vestlandet | 6.253 | 51.276 | 126.16 | 122.758 | 55.516 | 10.451 | 0.506 | 1.86 |
| 2005-2010 | NO | Norway | NO06 | Trøndelag | 5.295 | 57.452 | 117.916 | 120.339 | 49.749 | 9.151 | 0.579 | 1.8 |
| 2005-2010 | NO | Norway | NO07 | Nord-Norge | 9.01 | 65.359 | 113.889 | 105.83 | 49.468 | 10.661 | 0.249 | 1.77 |
| 2010-2015 | FI | Finland | FI13 | Itä-Suomi | 8.436 | 58.876 | 118.441 | 105.473 | 47.962 | 10.281 | 0.828 | 1.75 |
| 2010-2015 | FI | Finland | FI18 | Etelä-Suon | 6.211 | 42.052 | 92.676 | 110.745 | 53.85 | 13.574 | 0.688 | 1.6 |
| 2010-2015 | FI | Finland | FI19 | Länsi-Suor | 6.543 | 51.075 | 115.603 | 117.262 | 52.406 | 11.127 | 0.684 | 1.77 |
| 2010-2015 | FI | Finland | FI1A | Pohjois-Su | 8.561 | 76.021 | 137.624 | 126.488 | 60.122 | 16.064 | 0.755 | 2.13 |
| 2010-2015 | FI | Finland | FI20 | Åland | 1.226 | 56.142 | 90.507 | 110.212 | 50.143 | 15.329 | 1.982 | 1.63 |
| 2010-2015 | LV | Latvia | LV00 | Latvia | 15.518 | 62.033 | 78.319 | 56.053 | 26.121 | 5.527 | 0.429 | 1.22 |
| 2010-2015 | NO | Norway | NO01 | Oslo_og_A | 3.113 | 37.271 | 91.17 | 128.607 | 65.847 | 14.577 | 0.713 | 1.71 |
| 2010-2015 | NO | Norway | NO02 | Hedmark_( | 4.702 | 45.649 | 113.029 | 104.877 | 43.737 | 8.08 | 0.295 | 1.6 |
| 2010-2015 | NO | Norway | NO03 | Sør-Østlan | 4.92 | 48.247 | 116.31 | 109.098 | 41.983 | 8.669 | 0.367 | 1.65 |
| 2010-2015 | NO | Norway | NO04 | Agder_og_ | 6.491 | 56.988 | 133.431 | 115.455 | 48.709 | 8.348 | 0.567 | 1.85 |
| 2010-2015 | NO | Norway | NO05 | Vestlandet | 6.253 | 51.276 | 126.16 | 122.758 | 55.516 | 10.451 | 0.506 | 1.86 |
| 2010-2015 | NO | Norway | NO06 | Trøndelag | 5.295 | 57.452 | 117.916 | 120.339 | 49.749 | 9.151 | 0.579 | 1.8 |
| 2010-2015 | NO | Norway | NO07 | Nord-Norge | 9.01 | 65.359 | 113.889 | 105.83 | 49.468 | 10.661 | 0.249 | 1.77 |

## Box 7. Example of benchmark data on internal out-migration rates

Internal out-migration rates (per 1000) by age, Finland

| Sex | Origin regic | Origin regic | Destination | Dest regior | 4 | 9 | 14 | 19 | 24 | 29 | 34 | 39 | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 79 | 84 | 89 | 94 | 99 | 100+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Males | FI13 | Itä-Suomi | FI13 | Itä-Suomi | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Males | FI13 | Itä-Suomi | FI18 | Etelä-Suon | 11.553 | 7.163 | 5.068 | 16.767 | 58.613 | 46.52 | 19.524 | 11.228 | 6.946 | 4.956 | 4.306 | 3.394 | 3.946 | 3.075 | 2.227 | 1.738 | 1.745 | 1.757 | 1.757 | 1.757 | 1.757 |
| Males | FI13 | Itä-Suomi | FI19 | Länsi-Suor | 7.203 | 4.14 | 2.499 | 8.777 | 33.679 | 20.893 | 9.134 | 4.806 | 3.06 | 2.237 | 1.784 | 1.443 | 1.981 | 1.191 | 0.862 | 0.884 | 0.682 | 0.73 | 0.73 | 0.73 | 0.73 |
| Males | FI13 | Itä-Suomi | FI1A | Pohjois-Su | 5.354 | 2.866 | 1.983 | 5.149 | 16.649 | 12.085 | 5.42 | 3.022 | 2.102 | 1.494 | 0.999 | 0.933 | 1.098 | 0.591 | 0.382 | 0.422 | 0.323 | 0.468 | 0.468 | 0.468 | 0.468 |
| Males | FI13 | Itä-Suomi | FI20 | Åland | 0.008 | 0.004 | 0.005 | 0.008 | 0.022 | 0.023 | 0.012 | 0.005 | 0.003 | 0.003 | 0.002 | 0.002 | 0.002 | 0.001 | 0.001 | 0.002 | 0 | 0.005 | 0.005 | 0.005 | 0.005 |
| Males | FI18 | Etelä-Suon | FI13 | Itä-Suomi | 3.039 | 1.878 | 1.257 | 2.637 | 10.01 | 6.845 | 3.81 | 2.302 | 1.791 | 1.545 | 1.53 | 1.552 | 1.91 | 1.365 | 0.87 | 0.436 | 0.645 | 0.751 | 0.751 | 0.751 | 0.751 |
| Males | FI18 | Etelä-Suon | FI18 | Etelä-Suon | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Males | FI18 | Etelä-Suon | FI19 | Länsi-Suor | 5.78 | 3.749 | 2.218 | 6.011 | 24.236 | 15.479 | 8.056 | 4.597 | 3.101 | 2.337 | 2.09 | 2.053 | 2.633 | 2.098 | 1.298 | 1.009 | 0.914 | 0.862 | 0.862 | 0.862 | 0.862 |
| Males | FI18 | Etelä-Suon | FI1A | Pohjois-Su | 2.448 | 1.479 | 1.003 | 2.009 | 6.827 | 5.102 | 2.724 | 1.647 | 1.213 | 0.89 | 0.667 | 0.756 | 0.832 | 0.594 | 0.328 | 0.275 | 0.247 | 0.315 | 0.315 | 0.315 | 0.315 |
| Males | FI18 | Etelä-Suon | FI20 | Åland | 0.073 | 0.044 | 0.047 | 0.066 | 0.179 | 0.196 | 0.122 | 0.053 | 0.038 | 0.041 | 0.03 | 0.029 | 0.035 | 0.014 | 0.016 | 0.021 | 0 | 0.065 | 0.065 | 0.065 | 0.065 |
| Males | FI19 | Länsi-Suor | FI13 | Itä-Suomi | 2.496 | 1.305 | 0.87 | 2.388 | 9.604 | 6.351 | 3.026 | 1.546 | 1.182 | 1.092 | 0.87 | 0.794 | 0.871 | 0.496 | 0.377 | 0.21 | 0.261 | 0.373 | 0.373 | 0.373 | 0.373 |
| Males | FI19 | Länsi-Suor | FI18 | Etelä-Suon | 9.826 | 5.813 | 4.015 | 13.418 | 52.22 | 41.268 | 17.648 | 9.306 | 5.992 | 4.725 | 3.703 | 3.188 | 3.086 | 2.54 | 1.877 | 1.237 | 1.22 | 1.33 | 1.33 | 1.33 | 1.33 |
| Males | FI19 | Länsi-Suor | FI19 | Länsi-Suor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Males | FI19 | Länsi-Suor | FI1A | Pohjois-Su | 3.403 | 1.738 | 1.174 | 3.078 | 11.083 | 8.011 | 3.661 | 1.872 | 1.355 | 1.065 | 0.642 | 0.655 | 0.642 | 0.365 | 0.241 | 0.224 | 0.169 | 0.265 | 0.265 | 0.265 | 0.265 |
| Males | FI19 | Länsi-Suor | FI20 | Åland | 0.1 | 0.051 | 0.054 | 0.1 | 0.287 | 0.304 | 0.163 | 0.059 | 0.042 | 0.048 | 0.029 | 0.025 | 0.027 | 0.008 | 0.012 | 0.017 | 0 | 0.054 | 0.054 | 0.054 | 0.054 |
| Males | FI1A | Pohjois-Su | FI13 | Itä-Suomi | 3.698 | 1.998 | 1.425 | 3.941 | 13.637 | 8.864 | 4.461 | 2.461 | 2.017 | 1.746 | 1.413 | 1.203 | 1.404 | 0.829 | 0.658 | 0.255 | 0.468 | 0.784 | 0.784 | 0.784 | 0.784 |
| Males | FI1A | Pohjois-Su | FI18 | Etelä-Suon | 7.386 | 4.516 | 3.337 | 11.235 | 37.619 | 29.219 | 13.2 | 7.517 | 5.187 | 3.831 | 3.051 | 2.449 | 2.524 | 2.155 | 1.661 | 0.761 | 1.11 | 1.418 | 1.418 | 1.418 | 1.418 |
| Males | FI1A | Pohjois-Su | FI19 | Länsi-Suor | 5.894 | 3.341 | 2.107 | 7.528 | 27.67 | 16.798 | 7.905 | 4.119 | 2.925 | 2.214 | 1.618 | 1.333 | 1.622 | 1.068 | 0.823 | 0.495 | 0.555 | 0.755 | 0.755 | 0.755 | 0.755 |
| Males | FI1A | Pohjois-Su | FI1A | Pohjois-Su | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Males | FI1A | Pohjois-Su | FI20 | Åland | 0.025 | 0.013 | 0.015 | 0.028 | 0.068 | 0.071 | 0.04 | 0.016 | 0.012 | 0.013 | 0.008 | 0.006 | 0.007 | 0.002 | 0.003 | 0.003 | 0 | 0.019 | 0.019 | 0.019 | 0.019 |
| Males | FI20 | ?land | FI13 | Itä-Suomi | 0.159 | 0.051 | 0.057 | 0.053 | 0.434 | 0.308 | 0.19 | 0.146 | 0.098 | 0.104 | 0.066 | 0.066 | 0.054 | 0.023 | 0 | 0.029 | 0.029 | 0.053 | 0.053 | 0.053 | 0.053 |
| Males | FI20 | ?land | FI18 | Etelä-Suon | 6.152 | 2.25 | 2.568 | 2.945 | 23.222 | 19.703 | 10.921 | 8.624 | 4.894 | 4.426 | 2.782 | 2.595 | 1.89 | 1.174 | 0 | 1.682 | 1.331 | 1.858 | 1.858 | 1.858 | 1.858 |
| Males | FI20 | ?land | FI19 | Länsi-Suor | 3.534 | 1.199 | 1.167 | 1.421 | 12.295 | 8.154 | 4.708 | 3.402 | 1.987 | 1.841 | 1.062 | 1.017 | 0.874 | 0.419 | 0 | 0.789 | 0.479 | 0.712 | 0.712 | 0.712 | 0.712 |
| Males | FI20 | ?land | FI1A | Pohjois-Su | 0.63 | 0.199 | 0.222 | 0.2 | 1.458 | 1.132 | 0.67 | 0.513 | 0.327 | 0.295 | 0.143 | 0.158 | 0.116 | 0.05 | 0 | 0.09 | 0.054 | 0.109 | 0.109 | 0.109 | 0.109 |
| Males | FI20 | ?land | FI20 | Åland | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Females | FI13 | Itä-Suomi | FI13 | Itä-Suomi | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Females | FI13 | Itä-Suomi | FI18 | Etelä-Suon | 12.07 | 7.396 | 5.245 | 17.826 | 64.455 | 51.898 | 20.316 | 11.651 | 7.271 | 5.276 | 4.778 | 3.638 | 3.904 | 2.757 | 1.771 | 1.14 | 0.824 | 0.594 | 0.594 | 0.594 | 0.594 |
| Females | FI13 | Itä-Suomi | FI19 | Länsi-Suor | 7.525 | 4.275 | 2.587 | 9.331 | 37.036 | 23.308 | 9.505 | 4.987 | 3.203 | 2.382 | 1.979 | 1.547 | 1.96 | 1.068 | 0.685 | 0.58 | 0.322 | 0.247 | 0.247 | 0.247 | 0.247 |
| Females | FI13 | Itä-Suomi | FI1A | Pohjois-Su | 5.594 | 2.959 | 2.052 | 5.474 | 18.308 | 13.483 | 5.64 | 3.136 | 2.2 | 1.591 | 1.109 | 1 | 1.087 | 0.53 | 0.304 | 0.277 | 0.152 | 0.158 | 0.158 | 0.158 | 0.158 |
| Females | FI13 | Itä-Suomi | FI20 | Åland | 0.008 | 0.004 | 0.005 | 0.009 | 0.024 | 0.026 | 0.013 | 0.005 | 0.003 | 0.004 | 0.002 | 0.002 | 0.002 | 0.001 | 0.001 | 0.001 | 0 | 0.002 | 0.002 | 0.002 | 0.002 |
| Females | FI18 | Etelä-Suon | FI13 | Itä-Suomi | 3.163 | 1.944 | 1.307 | 2.735 | 9.99 | 6.854 | 3.902 | 2.334 | 1.821 | 1.539 | 1.452 | 1.476 | 1.757 | 1.161 | 0.655 | 0.27 | 0.289 | 0.227 | 0.227 | 0.227 | 0.227 |
| Females | FI18 | Etelä-Suon | FI18 | Etelä-Suon | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Females | FI18 | Etelä-Suon | FI19 | Länsi-Suor | 6.015 | 3.879 | 2.305 | 6.234 | 24.187 | 15.499 | 8.251 | 4.662 | 3.152 | 2.328 | 1.984 | 1.952 | 2.422 | 1.784 | 0.977 | 0.625 | 0.409 | 0.26 | 0.26 | 0.26 | 0.26 |
| Females | FI18 | Etelä-Suon | FI1A | Pohjois-Su | 2.548 | 1.53 | 1.042 | 2.084 | 6.813 | 5.109 | 2.79 | 1.67 | 1.233 | 0.886 | 0.633 | 0.719 | 0.765 | 0.505 | 0.247 | 0.17 | 0.11 | 0.095 | 0.095 | 0.095 | 0.095 |
| Females | FI18 | Etelä-Suon | FI20 | Åland | 0.076 | 0.045 | 0.048 | 0.068 | 0.179 | 0.196 | 0.125 | 0.054 | 0.039 | 0.041 | 0.029 | 0.028 | 0.032 | 0.012 | 0.012 | 0.013 | 0 | 0.02 | 0.02 | 0.02 | 0.02 |
| Females | FI19 | Länsi-Suor | FI13 | Itä-Suomi | 2.631 | 1.374 | 0.91 | 2.504 | 10.348 | 6.92 | 3.269 | 1.644 | 1.234 | 1.124 | 0.895 | 0.811 | 0.841 | 0.438 | 0.304 | 0.135 | 0.126 | 0.124 | 0.124 | 0.124 | 0.124 |
| Females | FI19 | Länsi-Suor | FI18 | Etelä-Suon | 10.358 | 6.123 | 4.199 | 14.072 | 56.264 | 44.961 | 19.063 | 9.899 | 6.253 | 4.86 | 3.808 | 3.254 | 2.981 | 2.242 | 1.51 | 0.793 | 0.589 | 0.442 | 0.442 | 0.442 | 0.442 |
| Females | FI19 | Länsi-Suor | FI19 | Länsi-Suor | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Females | FI19 | Länsi-Suor | FI1A | Pohjois-Su | 3.587 | 1.831 | 1.227 | 3.229 | 11.942 | 8.728 | 3.954 | 1.991 | 1.414 | 1.095 | 0.66 | 0.668 | 0.62 | 0.322 | 0.194 | 0.144 | 0.081 | 0.088 | 0.088 | 0.088 | 0.088 |
| Females | FI19 | Länsi-Suor | FI20 | Åland | 0.105 | 0.053 | 0.056 | 0.105 | 0.31 | 0.331 | 0.176 | 0.063 | 0.044 | 0.05 | 0.029 | 0.026 | 0.026 | 0.007 | 0.01 | 0.011 | 0 | 0.018 | 0.018 | 0.018 | 0.018 |
| Females | FI1A | Pohjois-Su | FI13 | Itä-Suomi | 3.92 | 2.116 | 1.462 | 4.144 | 15.307 | 9.928 | 4.957 | 2.676 | 2.13 | 1.818 | 1.52 | 1.27 | 1.403 | 0.768 | 0.555 | 0.178 | 0.24 | 0.277 | 0.277 | 0.277 | 0.277 |
| Females | FI1A | Pohjois-Su | FI18 | Etelä-Suon | 7.829 | 4.783 | 3.424 | 11.814 | 42.227 | 32.728 | 14.666 | 8.175 | 5.479 | 3.989 | 3.281 | 2.584 | 2.523 | 1.996 | 1.401 | 0.531 | 0.569 | 0.501 | 0.501 | 0.501 | 0.501 |
| Females | FI1A | Pohjois-Su | FI19 | Länsi-Suor | 6.248 | 3.539 | 2.162 | 7.916 | 31.059 | 18.815 | 8.783 | 4.48 | 3.09 | 2.305 | 1.74 | 1.407 | 1.622 | 0.989 | 0.694 | 0.346 | 0.285 | 0.267 | 0.267 | 0.267 | 0.267 |
| Females | FI1A | Pohjois-Su | FI1A | Pohjois-Su | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Females | FI1A | Pohjois-Su | FI20 | Åland | 0.026 | 0.014 | 0.015 | 0.029 | 0.077 | 0.079 | 0.045 | 0.017 | 0.013 | 0.013 | 0.008 | 0.007 | 0.007 | 0.002 | 0.003 | 0.002 | 0 | 0.007 | 0.007 | 0.007 | 0.007 |
| Females | FI20 | ?land | FI13 | Itä-Suomi | 0.171 | 0.055 | 0.058 | 0.059 | 0.492 | 0.324 | 0.2 | 0.139 | 0.1 | 0.097 | 0.062 | 0.066 | 0.063 | 0.023 | 0 | 0.023 | 0.017 | 0.021 | 0.021 | 0.021 | 0.021 |
| Females | FI20 | ?land | FI18 | Etelä-Suon | 6.623 | 2.427 | 2.616 | 3.266 | 26.285 | 20.728 | 11.475 | 8.216 | 5.004 | 4.124 | 2.588 | 2.602 | 2.187 | 1.14 | 0 | 1.315 | 0.778 | 0.744 | 0.744 | 0.744 | 0.744 |
| Females | FI20 | ?land | FI19 | Länsi-Suor | 3.805 | 1.293 | 1.189 | 1.575 | 13.918 | 8.578 | 4.947 | 3.241 | 2.032 | 1.715 | 0.988 | 1.02 | 1.012 | 0.407 | 0 | 0.616 | 0.28 | 0.285 | 0.285 | 0.285 | 0.285 |
| Females | FI20 | ?land | FI1A | Pohjois-Su | 0.679 | 0.215 | 0.226 | 0.222 | 1.651 | 1.191 | 0.704 | 0.489 | 0.335 | 0.275 | 0.133 | 0.158 | 0.135 | 0.048 | 0 | 0.071 | 0.032 | 0.044 | 0.044 | 0.044 | 0.044 |
| Females | FI20 | ?land | FI20 | Åland | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Box 8. Example of scenario data on internal migration

Internal migration scenario. Multipliers, by destination region

| Period | Origin cour | Origin cour | Sex | Origin regi | Origin region name | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2005-2010 | FI | Finland | Males | FI13 | Itä-Suomi | 1 | 1 | 1 | 1 | 1 | | |
| 2005-2010 | FI | Finland | Males | FI18 | Etelä-Suon | 1 | 1 | 1 | 1 | 1 | | |
| 2005-2010 | FI | Finland | Males | FI19 | Länsi-Suor | 1 | 1 | 1 | 1 | 1 | | |
| 2005-2010 | FI | Finland | Males | FI1A | Pohjois-Su | 1 | 1 | 1 | 1 | 1 | | |
| 2005-2010 | FI | Finland | Males | FI20 | Åland | 1 | 1 | 1 | 1 | 1 | | |
| 2005-2010 | FI | Finland | Females | FI13 | Itä-Suomi | 1 | 1 | 1 | 1 | 1 | | |
| 2005-2010 | FI | Finland | Females | FI18 | Etelä-Suon | 1 | 1 | 1 | 1 | 1 | | |
| 2005-2010 | FI | Finland | Females | FI19 | Länsi-Suor | 1 | 1 | 1 | 1 | 1 | | |
| 2005-2010 | FI | Finland | Females | FI1A | Pohjois-Su | 1 | 1 | 1 | 1 | 1 | | |
| 2005-2010 | FI | Finland | Females | FI20 | Åland | 1 | 1 | 1 | 1 | 1 | | |
| 2005-2010 | NO | Norway | Males | NO01 | Oslo_og_A | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2005-2010 | NO | Norway | Males | NO02 | Hedmark_( | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2005-2010 | NO | Norway | Males | NO03 | Sør-Østlan | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2005-2010 | NO | Norway | Males | NO04 | Agder_og_ | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2005-2010 | NO | Norway | Males | NO05 | Vestlandet | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2005-2010 | NO | Norway | Males | NO06 | Trøndelag | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2005-2010 | NO | Norway | Males | NO07 | Nord-Norg | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2005-2010 | NO | Norway | Females | NO01 | Oslo_og_A | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2005-2010 | NO | Norway | Females | NO02 | Hedmark_( | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2005-2010 | NO | Norway | Females | NO03 | Sør-Østlan | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2005-2010 | NO | Norway | Females | NO04 | Agder_og_ | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2005-2010 | NO | Norway | Females | NO05 | Vestlandet | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2005-2010 | NO | Norway | Females | NO06 | Trøndelag | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2005-2010 | NO | Norway | Females | NO07 | Nord-Norg | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2010-2015 | FI | Finland | Males | FI13 | Itä-Suomi | 1 | 1 | 1 | 1 | 1 | | |
| 2010-2015 | FI | Finland | Males | FI18 | Etelä-Suon | 1 | 1 | 1 | 1 | 1 | | |
| 2010-2015 | FI | Finland | Males | FI19 | Länsi-Suor | 1 | 1 | 1 | 1 | 1 | | |
| 2010-2015 | FI | Finland | Males | FI1A | Pohjois-Su | 1 | 1 | 1 | 1 | 1 | | |
| 2010-2015 | FI | Finland | Males | FI20 | Åland | 1 | 1 | 1 | 1 | 1 | | |
| 2010-2015 | FI | Finland | Females | FI13 | Itä-Suomi | 1 | 1 | 1 | 1 | 1 | | |
| 2010-2015 | FI | Finland | Females | FI18 | Etelä-Suon | 1 | 1 | 1 | 1 | 1 | | |
| 2010-2015 | FI | Finland | Females | FI19 | Länsi-Suor | 1 | 1 | 1 | 1 | 1 | | |
| 2010-2015 | FI | Finland | Females | FI1A | Pohjois-Su | 1 | 1 | 1 | 1 | 1 | | |
| 2010-2015 | FI | Finland | Females | FI20 | Åland | 1 | 1 | 1 | 1 | 1 | | |
| 2010-2015 | NO | Norway | Males | NO01 | Oslo_og_A | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2010-2015 | NO | Norway | Males | NO02 | Hedmark_( | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2010-2015 | NO | Norway | Males | NO03 | Sør-Østlan | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2010-2015 | NO | Norway | Males | NO04 | Agder_og_ | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2010-2015 | NO | Norway | Males | NO05 | Vestlandet | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2010-2015 | NO | Norway | Males | NO06 | Trøndelag | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2010-2015 | NO | Norway | Males | NO07 | Nord-Norg | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2010-2015 | NO | Norway | Females | NO01 | Oslo_og_A | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2010-2015 | NO | Norway | Females | NO02 | Hedmark_( | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2010-2015 | NO | Norway | Females | NO03 | Sør-Østlan | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2010-2015 | NO | Norway | Females | NO04 | Agder_og_ | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2010-2015 | NO | Norway | Females | NO05 | Vestlandet | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2010-2015 | NO | Norway | Females | NO06 | Trøndelag | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2010-2015 | NO | Norway | Females | NO07 | Nord-Norg | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

## Box 9. Example of benchmark data on emigration rates

Emigration rates by period-age (per 1000)

| Sex | Origin cour | Origin cour | Origin regi | Origin regi | 4 | 9 | 14 | 19 | 24 | 29 | 34 | 39 | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 79 | 84 | 89 | 94 | 99 | 100+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Males | FI | Finland | FI13 | Itä-Suomi | 1.8772 | 0.7682 | 0.7515 | 2.0263 | 3.278 | 2.9275 | 2.3334 | 1.1789 | 0.6751 | 0.3888 | 0.3042 | 0.6174 | 0.3236 | 0.1695 | 0.0842 | 0.0526 | 0.0566 | 0.0479 | 0.0479 | 0.0479 | 0.0479 |
| Males | FI | Finland | FI18 | Etelä-Suon | 5.1171 | 2.2628 | 2.3606 | 7.2573 | 10.3488 | 7.1522 | 5.3381 | 3.0364 | 2.0669 | 1.3969 | 1.1716 | 2.1292 | 1.122 | 0.6725 | 0.3622 | 0.2376 | 0.2402 | 0.1931 | 0.1931 | 0.1931 | 0.1931 |
| Males | FI | Finland | FI19 | Länsi-Suor | 2.4427 | 1.0688 | 1.0992 | 3.1833 | 4.4832 | 3.545 | 2.8055 | 1.5898 | 1.0441 | 0.658 | 0.5202 | 0.9646 | 0.509 | 0.2768 | 0.139 | 0.0893 | 0.0849 | 0.0699 | 0.0699 | 0.0699 | 0.0699 |
| Males | FI | Finland | FI1A | Pohjois-Su | 3.1059 | 1.4005 | 1.4603 | 4.128 | 6.1842 | 5.1274 | 4.1932 | 2.4084 | 1.5098 | 0.9279 | 0.7488 | 1.5462 | 0.8349 | 0.4389 | 0.2245 | 0.1491 | 0.1549 | 0.1395 | 0.1395 | 0.1395 | 0.1395 |
| Males | FI | Finland | FI20 | Åland | 21.6194 | 8.6994 | 9.2725 | 26.6934 | 50.5899 | 34.259 | 22.1978 | 12.7498 | 8.8369 | 6.0461 | 4.6249 | 8.6091 | 3.7413 | 2.448 | 1.2582 | 0.7864 | 0.6445 | 0.4108 | 0.4108 | 0.4108 | 0.4108 |
| Males | LV | Latvia | LV00 | Latvia | 4.0104 | 5.7842 | 5.3134 | 7.6787 | 10.6872 | 10.7677 | 8.8669 | 8.9159 | 7.4734 | 5.4788 | 4.8031 | 4.2999 | 3.551 | 5.6681 | 5.439 | 7.0118 | 8.2037 | 4.1369 | 4.1369 | 4.1369 | 4.1369 |
| Males | NO | Norway | NO01 | Oslo_og_A | 8.1266 | 3.9481 | 6.1794 | 20.6268 | 23.9643 | 12.9506 | 6.9608 | 5.0695 | 4.0868 | 3.2233 | 3.4857 | 5.9819 | 3.525 | 3.0896 | 1.8822 | 0.7487 | 0.4478 | 0.3697 | 0.3697 | 0.3697 | 0.3697 |
| Males | NO | Norway | NO02 | Hedmark_( | 3.2035 | 1.2326 | 1.7903 | 5.7631 | 7.2851 | 5.5967 | 3.0685 | 1.8576 | 1.4098 | 0.9786 | 0.9425 | 1.5441 | 0.9067 | 0.7002 | 0.3847 | 0.1493 | 0.089 | 0.0701 | 0.0701 | 0.0701 | 0.0701 |
| Males | NO | Norway | NO03 | Sør-Østlan | 4.0384 | 1.6488 | 2.4088 | 7.7148 | 9.7979 | 7.2141 | 3.9198 | 2.4821 | 1.8794 | 1.36 | 1.3244 | 2.2318 | 1.3248 | 1.0483 | 0.6246 | 0.2474 | 0.1503 | 0.1219 | 0.1219 | 0.1219 | 0.1219 |
| Males | NO | Norway | NO04 | Agder_og_ | 4.0948 | 1.6753 | 2.4986 | 8.1372 | 9.7837 | 7.096 | 4.2467 | 2.8306 | 2.1777 | 1.6185 | 1.6056 | 2.9741 | 1.7482 | 1.4134 | 0.8337 | 0.3595 | 0.2162 | 0.1561 | 0.1561 | 0.1561 | 0.1561 |
| Males | NO | Norway | NO05 | Vestlandet | 3.4806 | 1.4697 | 2.166 | 6.9173 | 8.3171 | 6.1707 | 3.6165 | 2.4139 | 1.8319 | 1.3206 | 1.2819 | 2.2841 | 1.3657 | 1.0826 | 0.6177 | 0.2503 | 0.149 | 0.105 | 0.105 | 0.105 | 0.105 |
| Males | NO | Norway | NO06 | Trøndelag | 3.8152 | 1.5948 | 2.3815 | 7.7337 | 9.2842 | 6.4179 | 3.7668 | 2.5089 | 1.9375 | 1.4127 | 1.3871 | 2.4339 | 1.3509 | 1.1606 | 0.6673 | 0.2583 | 0.1609 | 0.1263 | 0.1263 | 0.1263 | 0.1263 |
| Males | NO | Norway | NO07 | Nord-Norg( | 3.4418 | 1.3577 | 1.9464 | 6.4187 | 7.9252 | 6.0164 | 3.3979 | 2.116 | 1.6552 | 1.1997 | 1.121 | 1.9457 | 1.1177 | 0.8969 | 0.5432 | 0.2288 | 0.15 | 0.119 | 0.119 | 0.119 | 0.119 |
| Females | FI | Finland | FI13 | Itä-Suomi | 3.3226 | 1.2623 | 1.3547 | 3.7828 | 4.6458 | 3.646 | 2.3827 | 1.1352 | 0.6387 | 0.4061 | 0.4232 | 1.0622 | 0.4334 | 0.1961 | 0.1005 | 0.0677 | 0.069 | 0.0564 | 0.0564 | 0.0564 | 0.0564 |
| Females | FI | Finland | FI18 | Etelä-Suon | 7.63 | 3.1518 | 3.6137 | 11.1777 | 11.2574 | 6.7613 | 4.5374 | 2.4164 | 1.6059 | 1.1549 | 1.1793 | 2.7475 | 1.1815 | 0.6238 | 0.3459 | 0.2441 | 0.2345 | 0.172 | 0.172 | 0.172 | 0.172 |
| Females | FI | Finland | FI19 | Länsi-Suor | 4.2074 | 1.7279 | 1.9308 | 5.6538 | 6.0042 | 4.1584 | 2.868 | 1.5135 | 0.9498 | 0.6406 | 0.647 | 1.524 | 0.6418 | 0.304 | 0.1618 | 0.1082 | 0.1021 | 0.0782 | 0.0782 | 0.0782 | 0.0782 |
| Females | FI | Finland | FI1A | Pohjois-Su | 4.5064 | 1.9074 | 2.1086 | 6.1577 | 7.2283 | 5.1799 | 3.6936 | 1.9637 | 1.1644 | 0.7661 | 0.8157 | 2.1156 | 0.9128 | 0.4237 | 0.2297 | 0.1649 | 0.1656 | 0.139 | 0.139 | 0.139 | 0.139 |
| Females | FI | Finland | FI20 | Åland | 43.3603 | 16.4168 | 18.0885 | 57.1426 | 81.1448 | 44.2382 | 25.1641 | 12.3924 | 8.9776 | 6.0783 | 5.9311 | 15.234 | 6.4453 | 3.3714 | 1.9351 | 1.3246 | 1.0687 | 0.6308 | 0.6308 | 0.6308 | 0.6308 |
| Females | LV | Latvia | LV00 | Latvia | 6.9336 | 9.4137 | 9.5255 | 13.9826 | 14.0853 | 12.143 | 8.6734 | 7.9754 | 6.3219 | 4.8368 | 5.0355 | 5.2541 | 3.3684 | 4.5878 | 4.3803 | 5.7964 | 5.9155 | 3.733 | 3.733 | 3.733 | 3.733 |
| Females | NO | Norway | NO01 | Oslo_og_A | 11.8775 | 5.4826 | 9.4572 | 31.5518 | 24.5109 | 11.0523 | 5.6837 | 4.0447 | 3.1794 | 2.7141 | 3.6393 | 7.9405 | 3.8829 | 2.9312 | 1.8474 | 0.8849 | 0.5567 | 0.3999 | 0.3999 | 0.3999 | 0.3999 |
| Females | NO | Norway | NO02 | Hedmark_( | 4.9722 | 1.8661 | 2.8973 | 9.6477 | 8.9066 | 5.9075 | 2.6865 | 1.6027 | 1.148 | 0.8673 | 1.0635 | 2.2314 | 1.0526 | 0.7494 | 0.4573 | 0.202 | 0.1314 | 0.1075 | 0.1075 | 0.1075 | 0.1075 |
| Females | NO | Norway | NO03 | Sør-Østlan | 6.1343 | 2.3124 | 3.7436 | 12.1287 | 11.0892 | 6.9076 | 3.271 | 1.9745 | 1.4748 | 1.1347 | 1.4237 | 3.0445 | 1.4827 | 1.0397 | 0.6734 | 0.3171 | 0.2 | 0.1481 | 0.1481 | 0.1481 | 0.1481 |
| Females | NO | Norway | NO04 | Agder_og_ | 5.7404 | 2.224 | 3.6965 | 12.1838 | 10.5784 | 6.6274 | 3.429 | 2.1836 | 1.6384 | 1.3104 | 1.695 | 3.9802 | 1.8784 | 1.3789 | 0.8771 | 0.4212 | 0.2686 | 0.1864 | 0.1864 | 0.1864 | 0.1864 |
| Females | NO | Norway | NO05 | Vestlandet | 4.5723 | 1.8101 | 2.971 | 9.6811 | 8.3747 | 5.3296 | 2.7743 | 1.7421 | 1.3274 | 1.0099 | 1.2727 | 2.8837 | 1.4053 | 0.9848 | 0.5928 | 0.2785 | 0.1768 | 0.117 | 0.117 | 0.117 | 0.117 |
| Females | NO | Norway | NO06 | Trøndelag | 5.2084 | 2.0336 | 3.2847 | 10.7909 | 9.3241 | 5.8164 | 2.9447 | 1.8241 | 1.3998 | 1.1113 | 1.3601 | 3.065 | 1.4247 | 1.0738 | 0.6588 | 0.3052 | 0.1997 | 0.1445 | 0.1445 | 0.1445 | 0.1445 |
| Females | NO | Norway | NO07 | Nord-Norg( | 5.2349 | 1.9376 | 3.1377 | 10.328 | 9.4565 | 6.0955 | 2.865 | 1.775 | 1.3217 | 1.0527 | 1.2989 | 2.8784 | 1.3826 | 0.9803 | 0.6187 | 0.2901 | 0.1971 | 0.1424 | 0.1424 | 0.1424 | 0.1424 |

## Box 10. Example of scenario data on international migration

Emigration scenarios

Multipliers (to be applied to emigration rates), by projection period

| Sex | Country co | Country na | Region coc | Region nar | 2005-2010 | 2010-2015 | 2015-2020 | 2020-2025 | 2025-2030 | 2030-2035 | 2035-2040 | 2040-2045 | 2045-2050 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Males | FI | Finland | FI13 | Itä-Suomi | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Males | FI | Finland | FI18 | Etelä-Suon | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Males | FI | Finland | FI19 | Länsi-Suor | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Males | FI | Finland | FI1A | Pohjois-Su | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Males | FI | Finland | FI20 | Åland | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Males | LV | Latvia | LV00 | Latvia | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Males | NO | Norway | NO01 | Oslo_og_A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Males | NO | Norway | NO02 | Hedmark_( | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Males | NO | Norway | NO03 | Sør-Østlan | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Males | NO | Norway | NO04 | Agder_og_ | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Males | NO | Norway | NO05 | Vestlandet | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Males | NO | Norway | NO06 | Trøndelag | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Males | NO | Norway | NO07 | Nord-Norg( | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Females | FI | Finland | FI13 | Itä-Suomi | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Females | FI | Finland | FI18 | Etelä-Suon | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Females | FI | Finland | FI19 | Länsi-Suor | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Females | FI | Finland | FI1A | Pohjois-Su | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Females | FI | Finland | FI20 | Åland | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Females | LV | Latvia | LV00 | Latvia | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Females | NO | Norway | NO01 | Oslo_og_A | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Females | NO | Norway | NO02 | Hedmark_( | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Females | NO | Norway | NO03 | Sør-Østlan | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Females | NO | Norway | NO04 | Agder_og_ | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Females | NO | Norway | NO05 | Vestlandet | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Females | NO | Norway | NO06 | Trøndelag | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Females | NO | Norway | NO07 | Nord-Norg( | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

Geographical distribution in the destination

| | | |
|---|---|---|
| 2 | Finland | : by country and by region (1: by country; distribution by region proportional to population distribution) |
| 2 | Latvia | |
| 2 | Norway | |

Distribution of migrants by destination country (based on MIMOSA)

| Period | Sex | Origin cour | Origin cour | Finland | Latvia | Norway | Rest | Sum (should be 100) |
|---|---|---|---|---|---|---|---|---|
| 2005-2010 | Males | FI | Finland | 0 | 1.03 | 3.849 | 95.121 | 100 |
| 2005-2010 | Males | LV | Latvia | 0.888 | 0 | 1.087 | 98.025 | 100 |
| 2005-2010 | Males | NO | Norway | 3.932 | 0.376 | 0 | 95.692 | 100 |
| 2005-2010 | Females | FI | Finland | 0 | 0.963 | 4.571 | 94.466 | 100 |
| 2005-2010 | Females | LV | Latvia | 1.101 | 0 | 1.379 | 97.52 | 100 |
| 2005-2010 | Females | NO | Norway | 4.363 | 0.338 | 0 | 95.299 | 100 |
| 2010-2015 | Males | FI | Finland | 0 | 1.03 | 3.849 | 95.121 | 100 |
| 2010-2015 | Males | LV | Latvia | 0.888 | 0 | 1.087 | 98.025 | 100 |
| 2010-2015 | Males | NO | Norway | 3.932 | 0.376 | 0 | 95.692 | 100 |
| 2010-2015 | Females | FI | Finland | 0 | 0.963 | 4.571 | 94.466 | 100 |
| 2010-2015 | Females | LV | Latvia | 1.101 | 0 | 1.379 | 97.52 | 100 |
| 2010-2015 | Females | NO | Norway | 4.363 | 0.338 | 0 | 95.299 | 100 |

**Box 11. Example of scenario data on regional distribution of immigrants from within the system**

| Emigration scenarios | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Distribution of migrants by destination region (based on immigration data from the Sharepoint) | | | | | | | | | | |
| Period | Sex | Destination | Destination | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2005-2010 | Males | FI | Finland | 7.581 | 59.102 | 19.882 | 10.721 | 2.715 | | |
| 2005-2010 | Males | LV | Latvia | 100 | | | | | | |
| 2005-2010 | Males | NO | Norway | 31.727 | 6.533 | 14.722 | 14.574 | 14.227 | 7.336 | 10.881 |
| 2005-2010 | Females | FI | Finland | 8.88 | 58.355 | 20.298 | 10.173 | 2.293 | | |
| 2005-2010 | Females | LV | Latvia | 100 | | | | | | |
| 2005-2010 | Females | NO | Norway | 34.098 | 5.494 | 16.089 | 13.968 | 14.425 | 6.299 | 9.627 |
| 2010-2015 | Males | FI | Finland | 7.581 | 59.102 | 19.882 | 10.721 | 2.715 | | |
| 2010-2015 | Males | LV | Latvia | 100 | | | | | | |
| 2010-2015 | Males | NO | Norway | 31.727 | 6.533 | 14.722 | 14.574 | 14.227 | 7.336 | 10.881 |
| 2010-2015 | Females | FI | Finland | 8.88 | 58.355 | 20.298 | 10.173 | 2.293 | | |
| 2010-2015 | Females | LV | Latvia | 100 | | | | | | |
| 2010-2015 | Females | NO | Norway | 34.098 | 5.494 | 16.089 | 13.968 | 14.425 | 6.299 | 9.627 |
| 2015-2020 | Males | FI | Finland | 7.581 | 59.102 | 19.882 | 10.721 | 2.715 | | |
| 2015-2020 | Males | LV | Latvia | 100 | | | | | | |
| 2015-2020 | Males | NO | Norway | 31.727 | 6.533 | 14.722 | 14.574 | 14.227 | 7.336 | 10.881 |
| 2015-2020 | Females | FI | Finland | 8.88 | 58.355 | 20.298 | 10.173 | 2.293 | | |
| 2015-2020 | Females | LV | Latvia | 100 | | | | | | |
| 2015-2020 | Females | NO | Norway | 34.098 | 5.494 | 16.089 | 13.968 | 14.425 | 6.299 | 9.627 |
| 2020-2025 | Males | FI | Finland | 7.581 | 59.102 | 19.882 | 10.721 | 2.715 | | |
| 2020-2025 | Males | LV | Latvia | 100 | | | | | | |
| 2020-2025 | Males | NO | Norway | 31.727 | 6.533 | 14.722 | 14.574 | 14.227 | 7.336 | 10.881 |
| 2020-2025 | Females | FI | Finland | 8.88 | 58.355 | 20.298 | 10.173 | 2.293 | | |
| 2020-2025 | Females | LV | Latvia | 100 | | | | | | |
| 2020-2025 | Females | NO | Norway | 34.098 | 5.494 | 16.089 | 13.968 | 14.425 | 6.299 | 9.627 |
| 2025-2030 | Males | FI | Finland | 7.581 | 59.102 | 19.882 | 10.721 | 2.715 | | |
| 2025-2030 | Males | LV | Latvia | 100 | | | | | | |
| 2025-2030 | Males | NO | Norway | 31.727 | 6.533 | 14.722 | 14.574 | 14.227 | 7.336 | 10.881 |
| 2025-2030 | Females | FI | Finland | 8.88 | 58.355 | 20.298 | 10.173 | 2.293 | | |
| 2025-2030 | Females | LV | Latvia | 100 | | | | | | |
| 2025-2030 | Females | NO | Norway | 34.098 | 5.494 | 16.089 | 13.968 | 14.425 | 6.299 | 9.627 |

## Box 12. Example of data on immigration from the rest of the world

Immigration from Rest of World

Annual immigration numbers by period (MIMOSA 2005)

| Country co | Country na | 2005-2010 | 2010-2015 | 2015-2020 | 2020-2025 | 2025-2030 | 2030-2035 | 2035-2040 | 2040-2045 | 2045-2050 |
|---|---|---|---|---|---|---|---|---|---|---|
| FI | Finland | 23637 | 23637 | 23637 | 23637 | 23637 | 23637 | 23637 | 23637 | 23637 |
| LV | Latvia | 6732 | 6732 | 6732 | 6732 | 6732 | 6732 | 6732 | 6732 | 6732 |
| NO | Norway | 37249 | 37249 | 37249 | 37249 | 37249 | 37249 | 37249 | 37249 | 37249 |

Share of males by period

| Country co | Country na | 2005-2010 | 2010-2015 | 2015-2020 | 2020-2025 | 2025-2030 | 2030-2035 | 2035-2040 | 2040-2045 | 2045-2050 |
|---|---|---|---|---|---|---|---|---|---|---|
| FI | Finland | 49.4 | 49.4 | 49.4 | 49.4 | 49.4 | 49.4 | 49.4 | 49.4 | 49.4 |
| LV | Latvia | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 55 |
| NO | Norway | 48.3 | 48.3 | 48.3 | 48.3 | 48.3 | 48.3 | 48.3 | 48.3 | 48.3 |

Age distribution

| Sex | Country co | Country na | 4 | 9 | 14 | 19 | 24 | 29 | 34 | 39 | 44 | 49 | 54 | 59 | 64 | 69 | 74 | 79 | 84 | 89 | 94 | 99 | 100+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Males | FI | Finland | 7.949 | 4.253 | 4.297 | 11.638 | 17.182 | 14.064 | 10.249 | 7.463 | 5.413 | 3.979 | 3.03 | 5.32 | 1.883 | 1.668 | 0.829 | 0.503 | 0.191 | 0.089 | 0 | 0 | 0 |
| Males | LV | Latvia | 16.907 | 2.783 | 3.387 | 6.418 | 10.428 | 11.405 | 11.062 | 8.913 | 7.385 | 4.034 | 3.228 | 4.063 | 2.67 | 2.303 | 1.889 | 1.241 | 1.157 | 0.727 | 0 | 0 | 0 |
| Males | NO | Norway | 8.311 | 4.853 | 5.724 | 13.172 | 18.834 | 14.606 | 9.771 | 6.9 | 4.461 | 2.718 | 1.729 | 6.171 | 1.108 | 0.766 | 0.478 | 0.229 | 0.112 | 0.058 | 0 | 0 | 0 |
| Females | FI | Finland | 10.121 | 5.104 | 5.67 | 15.461 | 16.72 | 11.911 | 7.662 | 5.289 | 3.757 | 3.006 | 2.927 | 6.427 | 1.952 | 1.658 | 0.957 | 0.757 | 0.381 | 0.237 | 0 | 0 | 0 |
| Females | LV | Latvia | 21.146 | 3.351 | 4.48 | 8.475 | 10.073 | 9.47 | 8.057 | 6.167 | 5.037 | 2.954 | 3.009 | 4.853 | 2.654 | 2.191 | 2.1 | 1.846 | 2.256 | 1.88 | 0 | 0 | 0 |
| Females | NO | Norway | 10.404 | 5.721 | 7.401 | 17.187 | 17.996 | 12.177 | 7.198 | 4.795 | 3.037 | 2.007 | 1.632 | 7.321 | 1.125 | 0.747 | 0.541 | 0.339 | 0.219 | 0.151 | 0 | 0 | 0 |

Geographical distribution of immigrants from Rest of World by region

| | | |
|---|---|---|
| 2 | Finland | : as specified below |
| 1 | Latvia | : proportional to population distribution |
| 2 | Norway | : as specified below |

(here assumed the same as for in ism_scenario_2_reg)

| Period | Sex | Country co | Country na | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|---|
| 2005-2010 | Males | FI | Finland | 7.581 | 59.102 | 19.882 | 10.721 | 2.715 | 0 | 0 |
| 2005-2010 | Males | NO | Norway | 31.727 | 6.533 | 14.722 | 14.574 | 14.227 | 7.336 | 10.881 |
| 2005-2010 | Females | FI | Finland | 8.88 | 58.355 | 20.298 | 10.173 | 2.293 | 0 | 0 |
| 2005-2010 | Females | NO | Norway | 34.098 | 5.494 | 16.089 | 13.968 | 14.425 | 6.299 | 9.627 |
| 2010-2015 | Males | FI | Finland | 7.581 | 59.102 | 19.882 | 10.721 | 2.715 | 0 | 0 |
| 2010-2015 | Males | NO | Norway | 31.727 | 6.533 | 14.722 | 14.574 | 14.227 | 7.336 | 10.881 |
| 2010-2015 | Females | FI | Finland | 8.88 | 58.355 | 20.298 | 10.173 | 2.293 | 0 | 0 |
| 2010-2015 | Females | NO | Norway | 34.098 | 5.494 | 16.089 | 13.968 | 14.425 | 6.299 | 9.627 |
| 2015-2020 | Males | FI | Finland | 7.581 | 59.102 | 19.882 | 10.721 | 2.715 | 0 | 0 |
| 2015-2020 | Males | NO | Norway | 31.727 | 6.533 | 14.722 | 14.574 | 14.227 | 7.336 | 10.881 |
| 2015-2020 | Females | FI | Finland | 8.88 | 58.355 | 20.298 | 10.173 | 2.293 | 0 | 0 |
| 2015-2020 | Females | NO | Norway | 34.098 | 5.494 | 16.089 | 13.968 | 14.425 | 6.299 | 9.627 |
| 2020-2025 | Males | FI | Finland | 7.581 | 59.102 | 19.882 | 10.721 | 2.715 | 0 | 0 |
| 2020-2025 | Males | NO | Norway | 31.727 | 6.533 | 14.722 | 14.574 | 14.227 | 7.336 | 10.881 |
| 2020-2025 | Females | FI | Finland | 8.88 | 58.355 | 20.298 | 10.173 | 2.293 | 0 | 0 |
| 2020-2025 | Females | NO | Norway | 34.098 | 5.494 | 16.089 | 13.968 | 14.425 | 6.299 | 9.627 |
| 2025-2030 | Males | FI | Finland | 7.581 | 59.102 | 19.882 | 10.721 | 2.715 | 0 | 0 |
| 2025-2030 | Males | NO | Norway | 31.727 | 6.533 | 14.722 | 14.574 | 14.227 | 7.336 | 10.881 |
| 2025-2030 | Females | FI | Finland | 8.88 | 58.355 | 20.298 | 10.173 | 2.293 | 0 | 0 |
| 2025-2030 | Females | NO | Norway | 34.098 | 5.494 | 16.089 | 13.968 | 14.425 | 6.299 | 9.627 |
| 2030-2035 | Males | FI | Finland | 7.581 | 59.102 | 19.882 | 10.721 | 2.715 | 0 | 0 |
| 2030-2035 | Males | NO | Norway | 31.727 | 6.533 | 14.722 | 14.574 | 14.227 | 7.336 | 10.881 |
| 2030-2035 | Females | FI | Finland | 8.88 | 58.355 | 20.298 | 10.173 | 2.293 | 0 | 0 |
| 2030-2035 | Females | NO | Norway | 34.098 | 5.494 | 16.089 | 13.968 | 14.425 | 6.299 | 9.627 |

## Box 13. Example of labour force data

Activity rates (per 100) by 5-year age group (15-19 till 75+)

| Year | Sex | Country co | Country na | Region coc | Region nar | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 | 75+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2005 | Males | FI | Finland | FI13 | Itä-Suomi | 32.7 | 70.5 | 83.4 | 86.6 | 86.3 | 85.4 | 83.6 | 77.9 | 65.3 | 33.8 | 8.3 | 4.0 | 1.4 |
| 2005 | Males | FI | Finland | FI18 | Etelä-Suon | 35.1 | 75.8 | 89.6 | 93.1 | 92.8 | 91.8 | 89.9 | 83.7 | 70.3 | 36.3 | 8.9 | 4.3 | 1.5 |
| 2005 | Males | FI | Finland | FI19 | Länsi-Suor | 34.2 | 73.9 | 87.4 | 90.8 | 90.5 | 89.5 | 87.6 | 81.6 | 68.5 | 35.4 | 8.7 | 4.2 | 1.5 |
| 2005 | Males | FI | Finland | FI1A | Pohjois-Su | 33.4 | 72.1 | 85.3 | 88.6 | 88.3 | 87.3 | 85.5 | 79.7 | 66.8 | 34.6 | 8.5 | 4.1 | 1.4 |
| 2005 | Males | FI | Finland | FI20 | Åland | 36.7 | 79.1 | 93.6 | 97.3 | 96.9 | 95.9 | 93.8 | 87.4 | 73.4 | 37.9 | 9.3 | 4.5 | 1.6 |
| 2005 | Males | LV | Latvia | LV00 | Latvia | 15.9 | 73.2 | 91.1 | 90.8 | 91.9 | 89.0 | 91.5 | 86.0 | 76.2 | 42.3 | 27.8 | 14.8 | 1.5 |
| 2005 | Males | NO | Norway | NO01 | Oslo_og_A | 46.1 | 75.9 | 87.4 | 91.7 | 91.2 | 91.0 | 89.7 | 87.8 | 81.4 | 59.6 | 23.5 | 12.9 | 3.2 |
| 2005 | Males | NO | Norway | NO02 | Hedmark_( | 44.4 | 73.1 | 84.2 | 88.4 | 87.9 | 87.7 | 86.5 | 84.6 | 78.5 | 57.5 | 22.7 | 12.5 | 3.1 |
| 2005 | Males | NO | Norway | NO03 | Sør-Østlan | 44.6 | 73.4 | 84.6 | 88.8 | 88.3 | 88.1 | 86.9 | 85.0 | 78.8 | 57.7 | 22.8 | 12.5 | 3.1 |
| 2005 | Males | NO | Norway | NO04 | Agder_og_ | 45.6 | 75.1 | 86.5 | 90.8 | 90.3 | 90.1 | 88.8 | 86.9 | 80.6 | 59.0 | 23.3 | 12.8 | 3.2 |
| 2005 | Males | NO | Norway | NO05 | Vestlandet | 45.5 | 74.9 | 86.3 | 90.5 | 90.1 | 89.9 | 88.6 | 86.7 | 80.4 | 58.9 | 23.2 | 12.8 | 3.2 |
| 2005 | Males | NO | Norway | NO06 | Trøndelag | 44.6 | 73.5 | 84.6 | 88.8 | 88.4 | 88.2 | 86.9 | 85.0 | 78.9 | 57.8 | 22.8 | 12.5 | 3.1 |
| 2005 | Males | NO | Norway | NO07 | Nord-Norge | 44.3 | 73.0 | 84.1 | 88.2 | 87.8 | 87.6 | 86.4 | 84.5 | 78.4 | 57.4 | 22.7 | 12.4 | 3.1 |
| 2005 | Females | FI | Finland | FI13 | Itä-Suomi | 36.4 | 63.7 | 71.4 | 74.6 | 76.5 | 81.9 | 83.2 | 80.1 | 66.9 | 28.3 | 3.8 | 1.7 | 0.5 |
| 2005 | Females | FI | Finland | FI18 | Etelä-Suon | 40.1 | 70.2 | 78.6 | 82.2 | 84.3 | 90.2 | 91.7 | 88.2 | 73.7 | 31.1 | 4.2 | 1.9 | 0.5 |
| 2005 | Females | FI | Finland | FI19 | Länsi-Suor | 38.1 | 66.8 | 74.8 | 78.2 | 80.2 | 85.8 | 87.2 | 83.9 | 70.1 | 29.6 | 4.0 | 1.8 | 0.5 |
| 2005 | Females | FI | Finland | FI1A | Pohjois-Su | 37.6 | 65.8 | 73.6 | 77.0 | 78.9 | 84.5 | 85.9 | 82.6 | 69.0 | 29.2 | 3.9 | 1.8 | 0.5 |
| 2005 | Females | FI | Finland | FI20 | Åland | 42.3 | 74.2 | 83.1 | 86.8 | 89.1 | 94.3 | 94.5 | 93.2 | 77.9 | 33.0 | 4.4 | 2.0 | 0.5 |
| 2005 | Females | LV | Latvia | LV00 | Latvia | 11.0 | 52.4 | 76.0 | 79.2 | 82.8 | 89.0 | 83.5 | 79.9 | 63.5 | 32.2 | 15.7 | 5.9 | 1.5 |
| 2005 | Females | NO | Norway | NO01 | Oslo_og_A | 51.3 | 71.8 | 79.1 | 81.6 | 83.6 | 84.3 | 83.1 | 80.4 | 70.0 | 48.9 | 16.4 | 6.7 | 1.3 |
| 2005 | Females | NO | Norway | NO02 | Hedmark_( | 50.2 | 70.4 | 77.5 | 80.0 | 82.0 | 82.7 | 81.5 | 78.8 | 68.7 | 48.0 | 16.0 | 6.5 | 1.3 |
| 2005 | Females | NO | Norway | NO03 | Sør-Østlan | 50.0 | 70.1 | 77.3 | 79.8 | 81.7 | 82.4 | 81.2 | 78.6 | 68.5 | 47.8 | 16.0 | 6.5 | 1.3 |
| 2005 | Females | NO | Norway | NO04 | Agder_og_ | 50.2 | 70.4 | 77.5 | 80.0 | 82.0 | 82.6 | 81.5 | 78.8 | 68.7 | 47.9 | 16.0 | 6.5 | 1.3 |
| 2005 | Females | NO | Norway | NO05 | Vestlandet | 52.1 | 72.9 | 80.3 | 82.9 | 84.9 | 85.6 | 84.4 | 81.6 | 71.1 | 49.7 | 16.6 | 6.8 | 1.3 |
| 2005 | Females | NO | Norway | NO06 | Trøndelag | 49.6 | 69.4 | 76.5 | 79.0 | 80.9 | 81.6 | 80.4 | 77.8 | 67.8 | 47.3 | 15.8 | 6.4 | 1.3 |
| 2005 | Females | NO | Norway | NO07 | Nord-Norge | 50.9 | 71.2 | 78.5 | 81.0 | 83.0 | 83.7 | 82.5 | 79.8 | 69.5 | 48.5 | 16.2 | 6.6 | 1.3 |
| 2005 | Males | FI | Finland | FI13 | Itä-Suomi | 32.7 | 70.5 | 83.4 | 86.6 | 86.3 | 85.4 | 83.6 | 77.9 | 65.3 | 33.8 | 8.3 | 4.0 | 1.4 |
| 2010 | Males | FI | Finland | FI18 | Etelä-Suon | 35.1 | 75.8 | 89.6 | 93.1 | 92.8 | 91.8 | 89.9 | 83.7 | 70.3 | 36.3 | 8.9 | 4.3 | 1.5 |
| 2010 | Males | FI | Finland | FI19 | Länsi-Suor | 34.2 | 73.9 | 87.4 | 90.8 | 90.5 | 89.5 | 87.6 | 81.6 | 68.5 | 35.4 | 8.7 | 4.2 | 1.5 |
| 2010 | Males | FI | Finland | FI1A | Pohjois-Su | 33.4 | 72.1 | 85.3 | 88.6 | 88.3 | 87.3 | 85.5 | 79.7 | 66.8 | 34.6 | 8.5 | 4.1 | 1.4 |
| 2010 | Males | FI | Finland | FI20 | ?land | 36.7 | 79.1 | 93.6 | 97.3 | 96.9 | 95.9 | 93.8 | 87.4 | 73.4 | 37.9 | 9.3 | 4.5 | 1.6 |
| 2010 | Males | LV | Latvia | LV00 | Latvia | 15.9 | 73.2 | 91.1 | 90.8 | 91.9 | 89.0 | 91.5 | 86.0 | 76.2 | 42.3 | 27.8 | 14.8 | 1.5 |
| 2010 | Males | NO | Norway | NO01 | Oslo_og_A | 46.1 | 75.9 | 87.4 | 91.7 | 91.2 | 91.0 | 89.7 | 87.8 | 81.4 | 59.6 | 23.5 | 12.9 | 3.2 |
| 2010 | Males | NO | Norway | NO02 | Hedmark_( | 44.4 | 73.1 | 84.2 | 88.4 | 87.9 | 87.7 | 86.5 | 84.6 | 78.5 | 57.5 | 22.7 | 12.5 | 3.1 |
| 2010 | Males | NO | Norway | NO03 | S?r-?stlanc | 44.6 | 73.4 | 84.6 | 88.8 | 88.3 | 88.1 | 86.9 | 85.0 | 78.8 | 57.7 | 22.8 | 12.5 | 3.1 |
| 2010 | Males | NO | Norway | NO04 | Agder_og_ | 45.6 | 75.1 | 86.5 | 90.8 | 90.3 | 90.1 | 88.8 | 86.9 | 80.6 | 59.0 | 23.3 | 12.8 | 3.2 |
| 2010 | Males | NO | Norway | NO05 | Vestlandet | 45.5 | 74.9 | 86.3 | 90.5 | 90.1 | 89.9 | 88.6 | 86.7 | 80.4 | 58.9 | 23.2 | 12.8 | 3.2 |
| 2010 | Males | NO | Norway | NO06 | Tr?ndelag | 44.6 | 73.5 | 84.6 | 88.8 | 88.4 | 88.2 | 86.9 | 85.0 | 78.9 | 57.8 | 22.8 | 12.5 | 3.1 |
| 2010 | Males | NO | Norway | NO07 | Nord-Norge | 44.3 | 73.0 | 84.1 | 88.2 | 87.8 | 87.6 | 86.4 | 84.5 | 78.4 | 57.4 | 22.7 | 12.4 | 3.1 |
| 2010 | Females | FI | Finland | FI13 | Itä-Suomi | 36.4 | 63.7 | 71.4 | 74.6 | 76.5 | 81.9 | 83.2 | 80.1 | 66.9 | 28.3 | 3.8 | 1.7 | 0.5 |
| 2010 | Females | FI | Finland | FI18 | Etelä-Suon | 40.1 | 70.2 | 78.6 | 82.2 | 84.3 | 90.2 | 91.7 | 88.2 | 73.7 | 31.1 | 4.2 | 1.9 | 0.5 |
| 2010 | Females | FI | Finland | FI19 | Länsi-Suor | 38.1 | 66.8 | 74.8 | 78.2 | 80.2 | 85.8 | 87.2 | 83.9 | 70.1 | 29.6 | 4.0 | 1.8 | 0.5 |
| 2010 | Females | FI | Finland | FI1A | Pohjois-Su | 37.6 | 65.8 | 73.6 | 77.0 | 78.9 | 84.5 | 85.9 | 82.6 | 69.0 | 29.2 | 3.9 | 1.8 | 0.5 |
| 2010 | Females | FI | Finland | FI20 | ?land | 42.3 | 74.2 | 83.1 | 86.8 | 89.1 | 94.3 | 94.5 | 93.2 | 77.9 | 33.0 | 4.4 | 2.0 | 0.5 |
| 2010 | Females | LV | Latvia | LV00 | Latvia | 11.0 | 52.4 | 76.0 | 79.2 | 82.8 | 89.0 | 83.5 | 79.9 | 63.5 | 32.2 | 15.7 | 5.9 | 1.5 |
| 2010 | Females | NO | Norway | NO01 | Oslo_og_A | 51.3 | 71.8 | 79.1 | 81.6 | 83.6 | 84.3 | 83.1 | 80.4 | 70.0 | 48.9 | 16.4 | 6.7 | 1.3 |
| 2010 | Females | NO | Norway | NO02 | Hedmark_( | 50.2 | 70.4 | 77.5 | 80.0 | 82.0 | 82.7 | 81.5 | 78.8 | 68.7 | 48.0 | 16.0 | 6.5 | 1.3 |
| 2010 | Females | NO | Norway | NO03 | S?r-?stlanc | 50.0 | 70.1 | 77.3 | 79.8 | 81.7 | 82.4 | 81.2 | 78.6 | 68.5 | 47.8 | 16.0 | 6.5 | 1.3 |
| 2010 | Females | NO | Norway | NO04 | Agder_og_ | 50.2 | 70.4 | 77.5 | 80.0 | 82.0 | 82.6 | 81.5 | 78.8 | 68.7 | 47.9 | 16.0 | 6.5 | 1.3 |
| 2010 | Females | NO | Norway | NO05 | Vestlandet | 52.1 | 72.9 | 80.3 | 82.9 | 84.9 | 85.6 | 84.4 | 81.6 | 71.1 | 49.7 | 16.6 | 6.8 | 1.3 |
| 2010 | Females | NO | Norway | NO06 | Tr?ndelag | 49.6 | 69.4 | 76.5 | 79.0 | 80.9 | 81.6 | 80.4 | 77.8 | 67.8 | 47.3 | 15.8 | 6.4 | 1.3 |
| 2010 | Females | NO | Norway | NO07 | Nord-Norge | 50.9 | 71.2 | 78.5 | 81.0 | 83.0 | 83.7 | 82.5 | 79.8 | 69.5 | 48.5 | 16.2 | 6.6 | 1.3 |

## Appendix B. Guide to the MULTIPOLES output files

This appendix describes the output files generated by the MULTIPOLES projection software. All the files are text files, delimited with space (.txt files), tab (.tsv files), comma or semi-colon (.csv), as specified by the user in the parameter file. There are separate files with the results for countries, for regions and selected results for region types. The files containing population and labour force numbers and dependency ratios have a format suitable for the input into mapping tools, with geographical units (countries or regions) in rows and variables in columns.

The name of each file begins with a string of characters (further denoted by *) specified in the parameter file by the user. For example, the results of the DEMIFER reference projections are in the files STQ*.tsv (*Status quo* scenario), NMI*.tsv (*No migration* scenario) and NEM*.tsv (*No extra-Europe migration* scenario).

The following groups of files are produced by MULTIPOLES:

| | |
|---|---|
| *_s0.xxx<br>*_r0.xxx<br>*_t0.xxx | Total population of the countries (file s0), regions (file r0) and region types (file t0) by sex (total, males, females). |
| *_lfs0.xxx<br>*_lfr0.xxx | Total labour force (active population, composed of employed and unemployed) of the countries (file s0) and regions (file r0) by sex (total, males, females). |
| *_s1.xxx - *_s6.xxx<br>*_r1.xxx - *_r6.xxx | Population of the countries (files s1 – s6) and regions (files r1 – r6) by 5-year age group (from 0-5 to 100+) and sex.<br>Each file contains data for two years (fitting into Excel versions earlier than Excel 2007), so the number of files depends on the number of projection steps. E.g. for the 2005-2050 projection, r1 contains results for 2005 and 2010, r5 contains the results for 2045 and 2050. |
| *_lfs1.xxx - *_lfs6.xxx<br>*_lfr1.xxx - *_lfr6.xxx | Labour force of the countries (files s1 – s6) and regions (files r1 – r6) by 5-year age group (from 15-20 to 75+) and sex.<br>Each file contains data for 2 years. |
| *_INDN.xxx<br>*_INDR.xxx<br>*_INDT.xxx | Labour force dependency ratios ODR, EODR, LMDR and VODR for the countries (INDN), regions (INDR) and region types (INDT) for all projection years. |
| *_ACCN.xxx<br>*_ACCR.xxx | Population accounts for the countries and regions, by sex (males, females, total) and projection step, showing the values of initial and final population in each 5-year projection step and the values of the components of population change. |

**Variables in the files *_s0.xxx, *_r0.xxx and *_t0.xxx**

pt[yy][s] - Population of sex s in year yy (e.g. pt05m contains the number of males in 2005).

**Variables in the files *_lfs0.xxx and *_lfr0.xxx**

lf[yy][s] - Labour force of sex s in year yy (e.g. lf50f contains the size of female labour force in 2050).

lfb[n][yy][s] - Labour force of sex s in broad age group n in year yy There are four broad age groups: 15-25 (lfb1), 25-40 (lfb2), 40-65 (lfb3) and 65+ (lfb4).
For example, lfb205m is the size of male labour force aged 25-40 in 2005.

**Variables in the files *_s1.xxx - *_s6.xxx and *_r1.xxx - *_r6.xxx**

p[aa][yy][s] or p[a][yy][s] - Population in age group aa-(aa+5), sex s in year yy (e.g. p3510f contains the number of females in age group 35-40 in 2010; p050m contains the number of males in age group 0-5 in 2050; p10005t contains the size of total population in age group 100+ in 2005).

**Variables in the files *_lfs1.xxx - *_lfs6.xxx and *_lfr1.xxx - *_lfr6.xxx**

l[aa][yy][s] - Labour force in age group aa-(aa+5), sex s in year yy (e.g. l2505m contains the economically active males in age group 25-30 in 2005; l7520t contains the size of the total labour force in age group 75+ in 2020).

**Variables in the files *_INDN.xxx, *_INDR.xxx and *_INDT.xxx**

ODR[yy] - Old age dependency ratio in year yy.
EODR[yy] - Economic old age dependency ratio in year yy.
LMDR[yy] - Labour market dependency ratio in year yy.
VODR[yy] - Very old age dependency ratio in year yy.
(see the description of MULTIOPOLES for the definitions of ODR, EODR, LMDR and VODR).

**Variables in the files *_ACCN.xxx and *_ACCR.xxx**

SPN/SPR - Population at the beginning of the projection step.
SPNnext/SPRnext - Population at the end of the projection step.
births - Births
deaths - Deaths
natincr - Natural increase
inmir - Internal in-migration
outmir - Internal out-migration
inmis - Immigration from the countries of the modelled system (e.g. 31 ESPON countries)
outmis - Emigration to the countries of the modelled system (e.g. 31 ESPON countries)
extimm - Immigration from the rest of the world
extemi - Emigration to the rest of the world
netmig - Net migration
totincr - Total population change