

# Demography

## Worksheet 2

### A Tasks in Excel

The following tasks are to be carried out using the 'Demography' simulation in Excel. First read the instructions in Excel. Each task explains in detail how to conduct the simulation.

- In the following table you will see how the four influencing factors<sup>1</sup> develop in accordance with the SFSO's reference scenario. Enter these values into the Excel simulation.

(Note: enter the time horizon 2045 into the user instructions).

| Period                          | 2011–2015 | 2016–2020 | 2021–2025 | 2026–2030 | 2031–2035 | 2036–2040 | 2041–2045 |
|---------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Ø* number of children per woman | 1.53      | 1.55      | 1.55      | 1.55      | 1.6       | 1.6       | 1.6       |
| Ø male life expectancy          | 80.7      | 82.0      | 83.0      | 84.0      | 84.5      | 85.5      | 86.0      |
| Ø female life expectancy        | 84.9      | 85.5      | 86.5      | 87.5      | 88.0      | 88.5      | 89.5      |
| Ø annual net migration          | 74,892    | 70,000    | 65,000    | 60,000    | 50,000    | 40,000    | 30,000    |

\*Ø = average

- Decide in the following table whether the particular influencing factor has risen (+), stayed the same (0) or fallen (-).

| Period                         | 2016–2020 | 2021–2025 | 2026–2030 | 2031–2035 | 2036–2040 | 2041–2045 |
|--------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Ø number of children per woman |           |           |           |           |           |           |
| Ø male life expectancy         |           |           |           |           |           |           |
| Ø female life expectancy       |           |           |           |           |           |           |
| Ø annual net migration         |           |           |           |           |           |           |

- Select 2015 as the population pyramid year. Study the chart. The light green bars show the number of men of a particular age (the age is specified in the middle), the dark green the number of women. The wider the pyramid at a particular age, the more people there are of this age.

How many men aged 80–84 are there in 2015 (move the mouse cursor over the green bar to read the value)?

How many women aged 80–84 are there in 2015?

- Now set the population pyramid year and the year for the charts on the left to 2045.

How many men aged 80–84 do you see now? How many women?

<sup>1</sup> The influencing factors are demographic factors in a country, which have an impact on population development. The four most important are the average number of children per woman (total fertility rate), average life expectancy for men, average life expectancy for women, and average annual net migration.

- d. Calculate the difference in the values for 2015 and 2045. Compare this difference with the value in 2015. What do you see?

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- e. How does the total population figure change between 2015 and 2045? Calculate the difference between the population figure for 2015 and that for 2045.

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- f. Look at the chart on the old-age dependency ratio. How will it change between 2015 and 2045 according to the scenario? Calculate the difference. What does this change mean for pensions? Bear in mind, the old-age dependency ratio is the opposite to the ratio of working-age people to pensioners. An old-age dependency ratio of 33 means that one person of working age has to cover 33% of an individual's AHV pension. In this example, three people of working age cover one pensioner (see infobox on Worksheet 1).

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2. Enter the values from the following table. Only net migration has changed.

| Period                         | 2011–2015 | 2016–2020 | 2021–2025 | 2026–2030 | 2031–2035 | 2036–2040 | 2041–2045 |
|--------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Ø number of children per woman | 1.53      | 1.55      | 1.55      | 1.55      | 1.6       | 1.6       | 1.6       |
| Ø male life expectancy         | 80.7      | 82.0      | 83.0      | 84.0      | 84.5      | 85.5      | 86.0      |
| Ø female life expectancy       | 84.9      | 85.5      | 86.5      | 87.5      | 88.0      | 88.5      | 89.5      |
| Ø annual net migration         | 74,892    | 75,000    | 75,000    | 75,000    | 75,000    | 75,000    | 75,000    |

a. What is the old-age dependency ratio in 2045?

Calculate the difference in the old-age dependency values between 2015 and 2045.

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b. Now enter 30,000 as the average annual net migration for every year.

What is the old-age dependency ratio in 2045 now?

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c. Now enter 100,000 as the average annual net migration for every year.

What is the old-age dependency ratio in 2045?

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d. Compare the population figure in 2045 for question 2c with that for 1e.

Calculate the difference.

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e. What impact does higher net migration have on the old-age dependency ratio?

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f. How does higher net migration affect pension funding?

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g. What impact does higher net migration have on the total population figure?

What effects does this development have?

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Optional: Think of your own scenario for future demographic trends and enter these values into the simulation.

**B Further tasks**

3. Compare the data for Finland and Switzerland in the following table.

|                  | Ø number of children per woman | Ø male and female life expectancy | Ø annual net migration (per 1,000 inhabitants) | Old-age dependency ratio |
|------------------|--------------------------------|-----------------------------------|--|--------------------------|
| Switzerland 2015 | 1.54                           | 83.0                              | 8.5  | 29.0                     |
| Finland 2015     | 1.65                           | 81.6                              | 2.3  | 31.3                     |

Data: Eurostat, 2016

a. What differences do you see?

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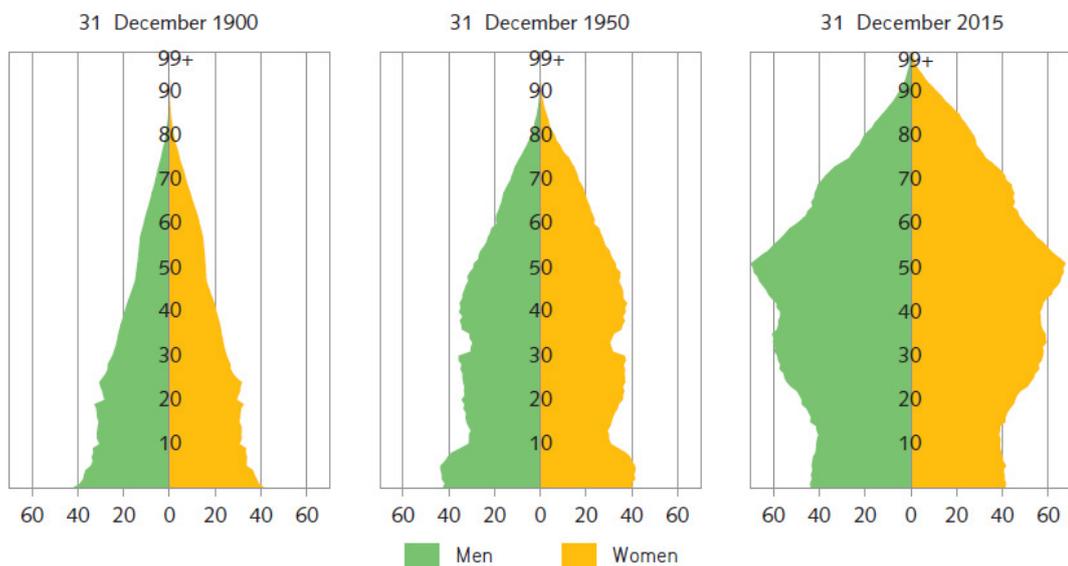
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b. Tick the appropriate boxes.

- In Switzerland about 2.5 people of working age finance one pensioner.
- In Finland about three people of working age finance one pensioner.
- Net migration per 1,000 inhabitants is more than three times higher in Switzerland than in Finland.
- Life expectancy in Switzerland is lower than in Finland.
- Finnish women on average have more children than Swiss women.

4. Look at the population pyramids for Switzerland shown below.

**Age structure of the population** (number of people in thousands)



Sources: SFSO – VZ, STATPOP, © SFSO, Neuchâtel 2017

a. Compare the shape of the three pyramids. Which age category is the biggest in each one?

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b. What strikes you about the shape of the three pyramids in general?  
How is the population distributed over the different age groups?

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c. How has total population developed?

- It has ...
- risen.
  - stayed the same.
  - fallen.

d. What impact does this change have on AHV funding?

Think about how the old-age dependency ratio develops when the age structure of the population changes.

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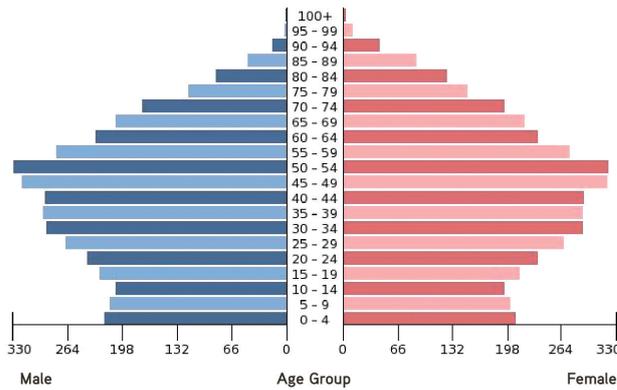
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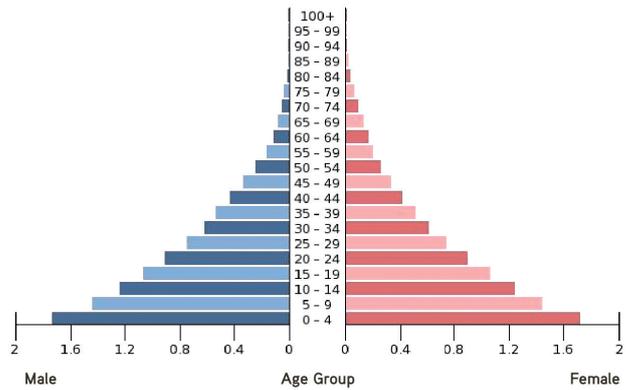
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5. Compare the population pyramid of Burkina Faso with that of Switzerland. Burkina Faso is a country in West Africa with a population of approximately 19 million. It is one of the poorest countries in the world. Approximately one third of the populations has to survive on less than USD 1.90 a day.<sup>2</sup>

Population Switzerland – 2016 (in thousands)



Population Burkina Faso – 2016 (in millions)



Data: index mundi, 2016

- a. Which age category is the largest in each case?

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- b. Why does Burkina Faso’s pyramid differ so strongly from Switzerland’s?

Think about the following factors: average number of children per woman, life expectancy, migration.

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<sup>2</sup> Source: index mundi