Commentary for teachers

Demographic change

Overview

Topic and contents

The unit shows a way of addressing the important but abstract topic of demographic change in the classroom.

Didactic format

The unit is based on an Excel simulation. This is a didactically simplified version of the model used by the Swiss Federal Statistical Office (SFSO) for its demographic forecasts. In creating the population growth scenarios, use is made of the fact that the size of a country's population and its age distribution at any given time depend on the development of three key variables: birth rate, death rate and net migration (the difference between immigration and emigration).

Students acquire the necessary knowledge step by step with the help of a series of activity-oriented tasks: Worksheet 1 serves to introduce key terms, concepts and facts such as birth rate, life expectancy and migration. In the course of working through Worksheet 2, students work intensively with the Excel simulation.

Time required

Three to four lessons, depending on the degree of detail with which the topic is addressed.

Suitable subjects

Economics and law, geography, history and civic studies.

Level

Intermediate to demanding.
The unit is mainly suitable for upper secondary school classes with a focus on economics and law.

Resources accompanying the unit

The 'Demographic change' unit comprises the commentary and the following teaching materials:

- Excel simulation (for teachers: Download, for students: edu.iconomix.ch)
- Presentation 'Switzerland's ageing population'
- Worksheet 1 (basic concepts)
- Worksheet 2 (work with the Excel simulation)
- Sample answers for teachers
- Video tutorial

Competence-oriented learning goals

The students are able to:

- Name and understand the factors influencing population development.
- Understand demographic developments in Switzerland over the course of time.
- Derive and analyse population scenarios using an Excel simulation.
- Critically reflect on the possibilities and limitations of demographic forecasts and models in general.

Notes regarding this unit

Economic background

Mortality rates at all phases of life have been declining for decades, with birth rates also declining after a delay. While the **global population** is still growing, sometime towards the end of this century it is likely to reach a peak and start shrinking. In **Europe** this point will already have been reached within a few years, after which Europe's population will decline and age.

The **population of Switzerland** is also ageing steadily. The reasons for this are consistently low **birth rates** below the level required to sustain the population, as well as rising **life expectancy**, especially in the elderly age group (mortality among children and people of working age has been very low for a long time). Even comparatively high **net migration** (immigration higher than emigration) cannot halt the 'superannuation' of the Swiss population. As a result, the proportion of people over 65 is constantly increasing; at the same time, the proportion of people of working age (15–64) is decreasing.

This changing age structure is affecting the **level of prosperity** measured in terms of GDP per head of population. This is happening via two mechanisms: **labour input** and **labour productivity**. Labour input is in clear decline because the working population is shrinking. The question is whether this decline can be offset by rising labour productivity.

Labour productivity depends, among other things, on capital deepening, in other words on capital investment per person employed. It is difficult to assess how this is influenced by the ageing of the population. For the sake of simplicity, let us assume that the decline in the working-age population probably cannot be offset by rising labour productivity. In this case, the ageing of the population is likely to significantly slow **per-capita economic growth** over time. At the same time, the **old-age dependency ratio** will increase, because the number of people younger than 15 and older than 64 will increase in relation to the working-age population.

Both developments – the decline in per-capita economic growth and the increase in the old-age dependency ratio – will have drastic consequences for **the economy, the state and society**. Public finances, in particular, will face major **challenges**: rising pension obligations (the pay-as-you-go system) and rising costs of health and long-term care (an increase in the number of very old-aged people) will put a strain on government budgets.

Certain developments, however, are likely to **alleviate** this burden. On average, older workers will be better qualified, better educated and healthier, and they will retire later than today. New technologies will help more people to be productive, regardless of their age. New technologies will both replace and supplement the workforce, and they will make work more flexible. Volunteer work – specifically care work – done by older people is also likely to play an important role.

These examples are only intended to give an indication of how fundamentally demographic change will shape the economy, the state and society in the coming decades. This is reason enough to take a close look at it in the classroom.

▸ **Sources used**

- Reto Föllmi, Torsten Schmidt and Philipp Jäger (2019): 'Demografischer Wandel und dessen Auswirkungen auf die Produktivität und das Wirtschaftswachstum'. Grundlagen für die Wirtschaftspolitik Nr. 1. SECO State Secretariat for Economic Affairs, Berne.
- David E. Bloom (March 2020): 'Changing Demographics and Economic Growth'. IMF Finance & Development, Vol. 57.
- David Amaglobeli, Era Dabla-Norris, and Vitor Gaspar (March 2020): 'Getting Older but Not Poorer'. IMF Finance & Development, Vol. 57.

Possible lesson plan

The unit centres on an Excel simulation. The Excel simulation is based on the model used by the Swiss Federal Statistical Office (SFSO) to derive population scenarios and make population forecasts for Switzerland. These SFSO demographic forecasts serve as a basis for planning in numerous economic and political domains such as land-use planning.

Worksheet 1 serves as an introduction to the topic. Completing the tasks in the worksheet enables students to get to know the key facts, terms and concepts such as life expectancy, birth rate, migration and old-age dependency ratio. Worksheet 2 builds on this, introducing students to the Excel simulation and then providing guidelines for working on more advanced questions. Analysis and evaluation of the students' answers in a group is aided by the sample answers for teachers.

The competences mapped out in the learning goals can be developed through the following three steps:

Phase 1: Introduction

To help get students into the topic, the teacher splits the class into four groups. Each group is given the task of presenting to the class a chart from the first part (slides 4 to 7) of the presentation 'Switzerland's ageing population'. The groups are given 5 minutes to work on the task before each group briefly presents its allotted chart. The pupils may want to be guided by the following questions, for example:

- What can you tell from the chart? (axes and progression of the curves or bars)
- What is the main message of the chart? (trend, possible explanations)

As an alternative to working in groups, the teacher can also introduce the topic by presenting the first part of the presentation 'Switzerland's ageing population'. The teacher can use the sample answers for Worksheet 1 to prepare.

After the introduction, with the help of the second part of Worksheet 1, students work step by step through the material on concepts such as life expectancy, birth rate,

migration and old-age dependency ratio, either individually or in groups. A compact evaluation and reflection of the solutions they develop could consist of the teacher presenting and discussing the sample answers from Iconomix in the group.

Phase 2: Work with the Excel simulation

Next, the students work independently on the tasks in Worksheet 2, Part A ('Work with the Excel simulation'), to develop and analyse future population scenarios. The necessary explanations can be found in the Excel simulation itself. If the students need support, this can be provided by the teacher or by other students (working as partners).

In Worksheet 2, Part B ('Further tasks'), the students compare countries, investigate the development of the age pyramid over time and reflect on the possibilities and limitations of demographic forecasts.

Phase 3: Reviewing tasks

Worksheet 2 (Part A and Part B) can be followed up by means of a group evaluation and analysis – it makes sense to start with the students' answers. For example, different solutions to the same tasks could be analysed. It is advisable to only present or put correct answers up for discussion to prevent wrong or misleading answers from causing confusion.

The challenge for the teacher is to moderate Phase 3 in such a way that the discussion is productive. The important thing at this phase is to build a common knowledge base and work out the key terms and concepts. The minimal option could be to present and discuss the sample answers for teachers in the group (the sample answers are deliberately detailed).

Overview of possible lesson plan

	Steps	Description	Media/material	Time
Phase 1 Engage with the material 45–60 minutes	Introduction	Group work: form four groups (one for each chart); work in groups Whole group: Presentations by the four groups	Computer and video projector; Presentation 'Switzerland's ageing population', Part 1	20 minutes
	Work through basic concepts	Individually or in groups: Work through Worksheet 1	Worksheet 1 (best accessed via the school's own LMS); individual tablets or laptops; WLAN connection	15–20 minutes
	Discussion	Whole group: Analysis of the results of worksheet 1	Computer and video projector; sample answers for Worksheet 1	10–20 minutes
Phase 2 Extend and apply knowledge 45 minutes	Work with the Excel simulation	Group work: Work through Worksheet 2, Part A and Part B (the latter possibly as homework)	Worksheet 2 and Excel simulation (best accessed via the school's own LMS); individual tablets or laptops; WLAN connection	45 minutes
Phase 3 Discuss and reflect 30–45 minutes	Discussion	Whole group: Analyse the results of Worksheet 2, Part A and Part B	Computer and video projector; as background information for the teacher: presentation (Parts 2 and 3)	30–45 minutes

Technical commentary on Worksheet 1

Task 4a

Possible reasons for women's higher life expectancy:

Biological factors:
Women have certain advantages from a biological perspective. These are partly genetic and partly caused by particular sex hormones (e.g. oestrogen). Studies indicate that biological factors produce a difference of one to two years in life expectancy.

Non-biological factors:
The non-biological factors that disadvantage men are often linked to their lifestyle:

- Men are more likely to have unhealthy habits (e.g. smoking or drinking alcohol).
- Men often have more dangerous jobs (e.g. construction and forestry).
- Men are under increasing amounts of social pressure which drives them to pursue a career and to be competitive, often leading to stress.
- Women visit the doctor more often (e.g. gynaecologist). Illnesses are thus recognised earlier and can be treated more successfully.

Sources: SFSO/Suva/M. Luy (2016). Gender-Specific Life Expectancy in Europe 1850-2010.

Possible reasons for the increase in life expectancy

The sharp fall in mortality in the 1950s was primarily due to the decline in infant mortality and in fatal infectious diseases. Since the 1960s, cardiovascular disease and cancer have become the main causes of death. The steady rise in life expectancy is therefore primarily attributable to the fall in mortality rates due to more efficient treatment of cardiovascular disease. Mortality rates from cancer, on the other hand, have changed little in the last 50 years.

Possible reasons for the reduction in the average number of children per woman:

High infant mortality in the past led to couples having more children on average. Knowledge of different family-planning methods has become more widespread over recent decades. Births can be planned. The contraceptive pill, in particular, has been widely used since the 1960s. Furthermore, since the introduction of the state pension (1948), parents are no longer reliant on their children providing for them in old age. In addition, women today have better access to education and a career, which can lead to them having children later and generally having fewer children.

Task 5b

Possible reasons for the increase in net migration in the 1960s:

As a result of the favourable economic situation at the beginning of the 1960s, many seasonal workers came to Switzerland. The situation of Italian seasonal workers living in Switzerland was governed by an agreement between Switzerland and Italy (1963). Many families also moved to live with relatives in Switzerland during this period.

Possible reasons for the negative net migration in the 1970s:

The oil crisis and the economic crisis in the 1970s brought the economic boom in Switzerland to an end. Many foreigners had to leave Switzerland due to a lack of work.

Possible reasons for the increase in net migration from 2000:

The 2002 agreement on the free movement of persons between Switzerland and EU countries made migration easier. Due to its favourable economic situation, high quality of living and good educational system, Switzerland has attracted many European migrants.

Task 6

Central to this task is the assumption that all other influencing factors remain unchanged. In reality, it cannot be assumed that only individual factors change. Often different factors change at the same time. This makes it difficult to assess the impact on demographic trends. Changes in the framework conditions (e.g. changes in the law to support families or facilitate migration) can create incentives. However, there is no guarantee that the working population will actually increase as a result.