

Demographic transition model: country comparisons

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A case study on the demographic transition model

The demographic transition model (DTM) is an important diagram in GCSE geography and shows how a population of a country changes. It does this by comparing what happens to the birth rate and the death rate over time. The DTM is represented by a graph which originally (in 1929) was divided into four stages of change based on what happened in European countries. An assumption then was that all countries would progress through these stages as factors such as increased food supply, economic development, technological development, and cultural change took place. Recently it has been suggested that a fifth stage may need to be added to the model.

This unit explores the relevance of the DTM to two contrasting countries: Germany and Mauritius.

Key vocabulary

birth rate, death rate, economic recession, economic boom, immigration, fertility rate, pro-natalist policy

Learning outcome

At the end of this case study you will be familiar with the demographic transition model (DTM) and its stages. You will also understand the population changes in a developed country – Germany – and in a developing country – Mauritius.

Relevance to specifications

AQA A	Unit 2: Human Geography, Section A, Population Change, page 16 http://filestore.aqa.org.uk/subjects/AQA-9030-W-SP-14.PDF
AQA B	Unit 1: Managing places in the 21st century, The urban environment, pages 10–12 http://filestore.aqa.org.uk/subjects/AQA-9035-W-SP-14.PDF
Edexcel A	Unit 3: The Human Environment, Section A, The Human World, Topic 3, Population Change, pages 35 and 36

	http://www.edexcel.com/migrationdocuments/GCSE%20New%20GCSE/9781446911907_GCSE_Lin_Geog_A_Issue_5.pdf
Edexcel B	Unit 2: People and the Planet, Section A, Introduction to People and the Planet, Topic 1, Population Dynamics, page 22 http://www.edexcel.com/migrationdocuments/GCSE%20New%20GCSE/9781446911914_GCSE_Lin_Geog_B_Issue_5.pdf
OCR A	Unit A731: Contemporary Themes in Geography, Unit 3: Similarities and Differences in Settlements and Population, pages 20–22 http://www.ocr.org.uk/Images/82576-specification.pdf
OCR B	Unit B563: Key Geographical Themes, Topic 2, Theme 2: Population and Settlement, pages 14 and 15 http://www.ocr.org.uk/Images/82581-specification.pdf
WJEC A	Unit 1: The Core, The Global World, Theme 4, Changing Populations, page 16 http://www.wjec.co.uk/qualifications/geography/geography-gcse/16128.pdf?language_id=1
WJEC B	Unit 1: Challenges and Interactions in Geography, Theme 3: Uneven development and sustainable environments, page 22 http://www.wjec.co.uk/uploads/publications/17213.pdf?language_id=1
CCEA	Unit 2: Living in Our World, Theme A: People and Where They Live, page 16; a copy of the specification can be downloaded from: http://www.rewardinglearning.org.uk/microsites/geography/gcse/index.asp
Cambridge IGCSE	Theme 1: Population and settlement, pages 12–14 http://www.cie.org.uk/images/150857-2016-syllabus.pdf
Edexcel IGCSE	Section C, Global issues, Topic 9, Development and human welfare, page 15 https://www.edexcel.com/migrationdocuments/IGCSE%20New%20IGCSE/IGCSE2009_Geography_(4GEO)_Specification.pdf

Demographic transition model: country comparisons

The demographic transition model (DTM), shown in Figure 1, is a well-established model used to show how a country's population dynamics (demography) change over time.

Stage 1: There is both a high birth rate and a high death rate, which is typical of many developed countries 150 years ago and some of the poorest countries today.

Stage 2: The death rate drops due to improvement in health and diet but the birth rate stays high because of tradition and slow response. Population grows quickly in stage 2, which is typical of many developing countries today.

Stage 3: The birth rate falls quickly and the decline in death rate slows.

Stage 4: eventually the birth rate is in balance with the death rate, so population growth is once again slow. Many European countries are now in stage 4.

Stage 5: If the birth rate goes below the death rate then the population could decline. But there may be other factors that influence birth rates and death rates in the future, e.g. economic cycles.

European countries used to have a large share of the world's population when they progressed through stages 2 and 3, but growth rate slowed in stage 4, and Germany's DTM has now moved into stage 5. Developing world areas are mostly still in stages 2 and 3, and their populations are growing rapidly (Figure 2). Here, birth rates tend to be higher and death rates lower due to more rapid economic and cultural change. Mauritius, located in the Indian Ocean, is an example of one of these countries.

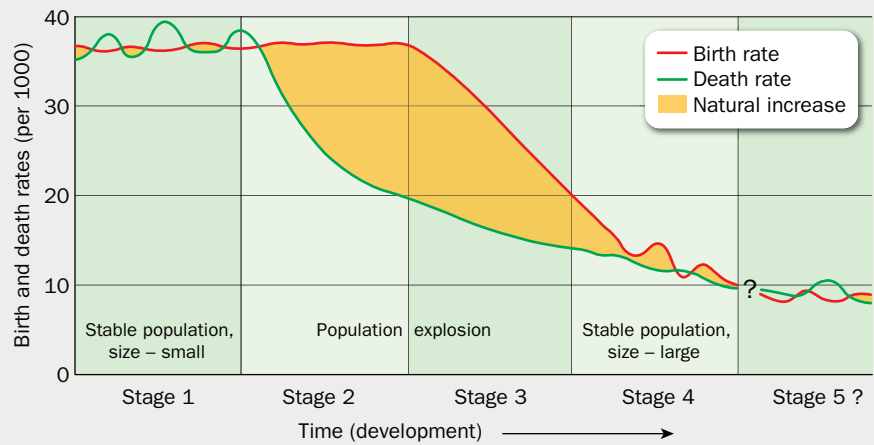


Figure 1 The demographic transition model

Case Study 1 Demographic transition of Germany

Up to 1945

By 1900 Germany had entered stage 3 of the DTM as the birth rate had started to decline dramatically (Figure 3), reducing from over 35 per 1000 to under half this figure by 1933. The death rate also continued to decline, from over 20 per 1000 to under half that level. Figure 3 clearly shows the impact of the First World War on death rates and birth rates, but note that this does not affect the overall downward trends.

After the 1930s period of economic recession, when the birth rate declined due to the expense of children, Germany entered stage 4 of the DTM. Birth rates then increased due to the combined impact of peace and better economic conditions, but then this trend is affected by the Second

World War, which increased the death rate and decreased the birth rate. The impact of the government's pro-natalist policy can be seen on birth rates before the start of the war (1939/40).

1945–1970s

After the war the death rate returned to about the same level that it had reached before, and the birth rate at first levelled off but then increased in the mid-1960s due to an economic boom. In this period immigration was important to Germany, particularly the 'guest worker programme' (from the late 1950s), and these immigrants settled with their families (the peak was in 1969/70). These migrants brought with them a culture of larger families, but even with this influence, the birth rate dropped below the death rate for the first time in 1972. This was the start of a DTM stage 5; the country has experienced a population decline

	1950 world population share (%)	2050 predicted world population share (%)	2050 predicted population over 60 years of age (%)
Africa	9.0	21.8	12.0
Europe	21.6	7.6	44.0

Figure 2 Population data for Africa and Europe

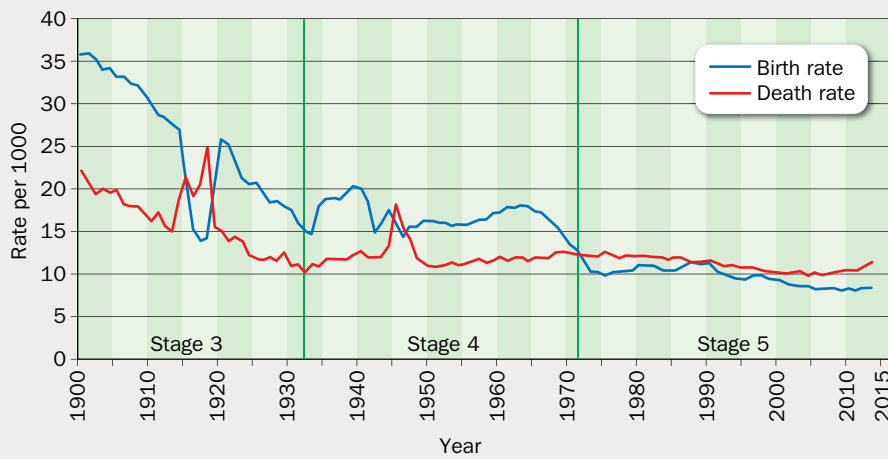


Figure 3 DTM for Germany since 1900

for over 40 years, with a fertility rate now around 1.4 – well below replacement level of 2.1 children.

Reunification to the present day

Before 1990 East Germany had pro-natalist policies (family allowances, maternity leave, childcare subsidies), but when Germany reunited in 1990, many people moved from the east to the west and so these policies were ineffective after this date. There has been a slight rise in the death rate recently, due to the 1939/40 baby boom reaching an advanced age.

Germany now faces two population issues linked to its demographic change:

- 1 a very low birth rate and consequent ageing and shrinking population
- 2 integration of migrant populations.

German culture is making both of these problems difficult to solve.

Reasons for the low birth rate include:

- uncertainty about the economic future (2007 recession)
- most families have both adults working full time
- traditional cultural expectation that mothers stay at home with their children, and are not seen as businesswomen after having children
- childcare and schooling only last

half a day, which makes it difficult for parents to work full time.

Consequently in modern Germany, women have not combined a career and children, keeping their options open for as long as possible. The German government did not take any action until the present century, but now there are generous parents' allowances (from 2006), longer hours of childcare facilities (from 2012), childcare payments, and tax breaks, with a government budget of about £160 billion a year. But a 2001 survey found that 26% of women aged 18 to 34 would prefer 1 or 0 children, showing that these incentives are not working. More women are delaying having children until after 30 years of age. Between 2000 and 2013 the birth rate fell by 11%. It is predicted that Germany's population will continue to shrink, to perhaps 66 million by 2060 – a smaller population than that of the UK or France.

Action is also focusing on the elderly, with the introduction of later retirement ages, flexible working hours, and automation and redesign of working areas to enable older people to continue to work. Germany can use EU workers, but recently southern European workers have not stayed long, so immigrants from beyond Europe may be needed.

**Case Study 2
Demographic transition of Mauritius**

Up to 1945

Mauritius is a very different country from Germany. It is an island in the Indian Ocean which is heavily reliant on tourism. It has a relatively small population. From before 1900 and up to 1945, Mauritius was in stage 1 of the DTM, with both birth rates and death rates very high, between 30 and 40 per 1000 (Figure 4). Despite French and British colonial influences, there was a lack of birth control and the desire for a large family was very strong. Immigration was significant before 1910 but not since, so this has not influenced population change in the country. The death rate fluctuated due to epidemics (1919: flu killed 24 455) and natural disasters (e.g. cyclones). After each disaster there was an increase in the birth rate to replace the lost population. The death rate

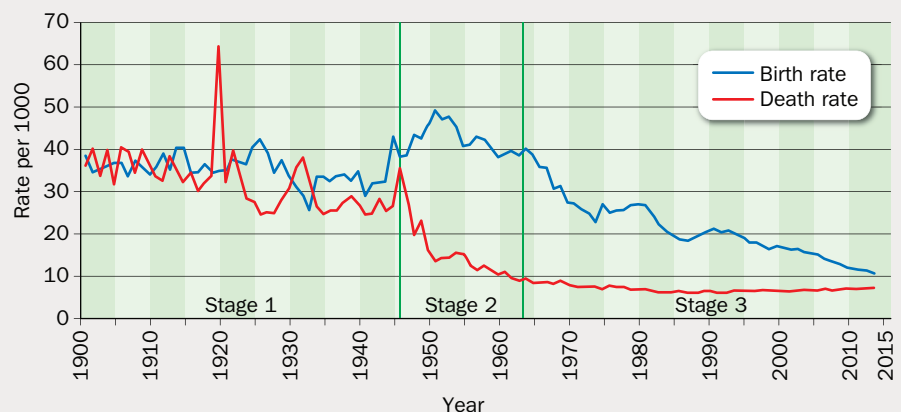


Figure 4 DTM for Mauritius since 1900

average fell after 1921 to around 26 per 1000, but there were still major peaks (e.g. 1931 cyclone), suggesting a sub-phase within stage 1. In the 1940s there were polio and dysentery epidemics, and another cyclone. After 1945 the death rate declined rapidly to around 10 per 1000 in 1961, mainly due to the elimination of malaria – this is the start of DTM stage 2. This decline was also due to other medical advances and healthcare provision, better living conditions (hygiene and sanitation), and better health and safety at work.

1945–1970s

The birth rate remained very high and actually increased, reaching nearly 50 per 1000 in 1950. This was due to the better medical care and living conditions, helped by aid from the UK at the end of the Second World War, which reduced infant and child mortality rates and increased life expectancy. Consequently, there was a population explosion in Mauritius between 1945 and the 1960s (Figure 5).

In 1958 a Family Planning Association was set up, and in 1963 a campaign called Action Familiale influenced a decline in the birth rate from a religious viewpoint. From 1963 the birth rate declined sharply, marking the start of stage 3; this was due to the introduction of improved

contraception and education which gave women greater freedom over their fertility. There was a fall in birth rate during the 1970s, after a peak growth rate of 3.6%, due to the introduction of compulsory free education for children (from 1976) and an improved role for women in Mauritian culture. Declining infant and child mortality rates also meant that lots of children were no longer needed to ensure that some survived.

1980s to present day

A decline in the birth rate in the late 1980s, linked to economic recession, shows that globalisation reaches even remote parts of the world. Birth rates moved towards the same level as death rates, and a recent census revision by Statistics Mauritius confirmed this trend (accuracy can be a problem in developing countries). Mauritius may have just started stage 4, but this depends on what happens to birth rates in the future. There is likely to be an ageing population issue in Mauritius: in 1962 only 3% of the population were over 60 but by 2032 this could be 19%, with a population growth rate below 0.6%. The government has already introduced free travel, regular social activities, a universal pension plan, and an annual budget for the elderly. It is also proposed to raise the retirement age to 65, to reduce the burden on the National Pensions Fund.

The death rate levelled off to well under 10 per 1000 from the 1980s – a typical level for a fully developed country, and lower than Germany’s! This is due to improved socio-economic conditions and healthcare (with external help), including technology to mitigate disasters (e.g. weather radar with aid from Japan). Therefore population growth continues today, although it is slowing (Figure 5). Mauritius has experienced a stage 3 that is at least 45 years long, after a stage 2 that lasted less than 20 years.

Conclusion

- The demographic transition model originally had four stages, but Germany’s population change suggests that there may need to be a fifth stage.
- Developed countries and developing countries have experienced slightly different rates of change, but also many similarities.
- There are similar influences on birth rates and death rates in developed and developing countries; these include social and economic factors.
- The contemporary issue of ageing populations affects developed countries, and will affect developing countries in the future.

“ There are similar influences on birth rates and death rates in developed and developing countries. ”

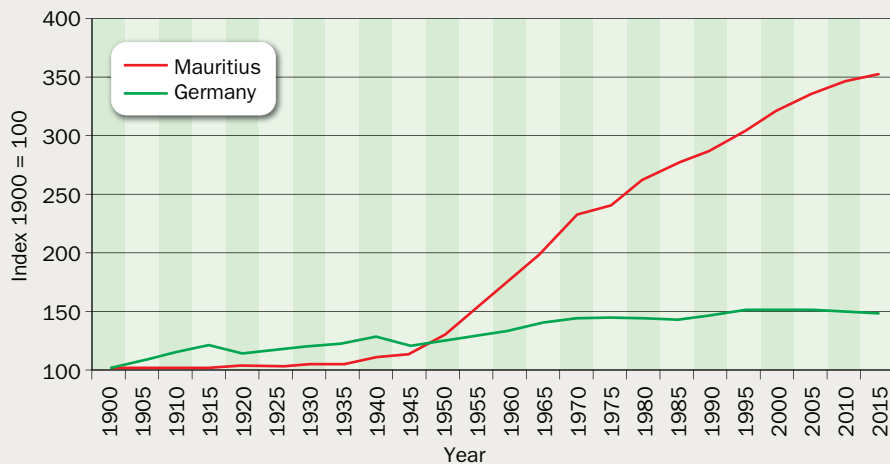


Figure 5 Population growth in Mauritius and Germany, 1900–2013

Activities

- 1** Using websites such as Nationmaster and World Bank, produce a brief geographical profile of Germany and Mauritius. This should include location, area, current population size, current population density, climate, industries and economy, language, culture, economic and political links etc.
- 2** Study Figures 3 and 4. Describe the changes in population growth for Mauritius and Germany (1900 to present).
- 3** Before 1933, Germany was in stage 3 of the DTM. Using Figure 6 to help you:
 - a** Outline the main influences that affected the birth rate during this stage.
 - b** Outline the main influences that affected the death rate during this stage.
- 4** Discuss the extent to which the First World War and the Second World War affected Germany's demographic transition.
- 5** Since 1972, Germany's birth rate has been below its death rate.
 - a** Outline the population issues that this has brought.
 - b** Suggest how Germany could achieve a balanced population in the future.
- 6** Before 1945 Mauritius was in stage 1 of the DTM. Using Figure 6 to help you:
 - a** Outline the main influences that affected the birth rate during this stage.
 - b** Outline the main influences that affected the death rate during this stage.
- 7**
 - a** What happened around 1945 to cause Mauritius to enter stage 2 of the DTM?
 - b** Suggest why stage 2 was relatively short for Mauritius.

Stage 1 High stationary	Stage 2 Early expanding	Stage 3 Late expanding	Stage 4 Low stationary
Subsistence economies with child workforce	Start of economic development (secondary jobs) and wealth, but with pollution	Economic development and prosperity; use of technology and machinery reduces need for workers	Relatively stable advanced economies with tertiary and quaternary jobs
Lack of understanding of family planning/birth control	Children viewed as economic asset, working for the family	Provision of universal education, so girls and boys attend school rather than work; later marriages	Equality for women, more career opportunities; better understanding of birth control and family planning
Low levels of education and technology, limited healthcare	Improvements to healthcare and increasing medical knowledge	Improvements in health services and medical technology	Education and health services fully developed
Poor living conditions	Some improvements to living conditions	Living conditions continue to improve, smaller family units, wealth increases	Living conditions at a very high standard, later marriages
Irregular food supply (famines and malnutrition)	Improved food supplies with better farming techniques	Mechanisation of farming; first pensions introduced, less reliance on children for support	State pensions, child benefit, free school meals
Disease and natural disasters	Occasional epidemic and natural disaster	Epidemics and disasters rarer	Possible epidemics controlled
Lack of population mobility	Start of urbanisation	Urbanisation rates increase. Urban infrastructure improves; state population policies introduced	Smaller family units (more divorce and single parent families), state population policies

Figure 6 Influences in the DTM stages

- 8** Has Mauritius entered stage 4 of the DTM? Present the evidence for your answer.
- 9** Compare how Germany and Mauritius are trying to tackle the issue of an ageing population.
- 10** Why have Germany and Mauritius experienced stages that are of different time lengths?
- 11** There is always debate about whether a model is useful or not in representing reality. Suggest three strengths and three weaknesses of the demographic transition model.

Extension activity

- 12** Consider how each of the following factors may influence a possible worldwide stage 5 of the DTM:
 - environmental stress
 - resource depletion
 - economic cycles
 - migration
 - lifestyle disease
 - medical advancements
 - government policies
 - armed conflicts.

Think about how each factor would affect birth rates and death rates.

Learning checkpoint

- The DTM shows how the population of countries may change over time.
- European countries have experienced all four stages of the DTM, and Germany has been in a fifth stage for 40 years.
- Natural and socio-economic factors, linked to the development of a country, have caused the changes to birth rates and death rates.

Glossary task

Write glossary definitions for these terms:

- | | |
|--------------------|---------------------|
| birth rate | fertility rate |
| death rate | immigration |
| economic boom | pro-natalist policy |
| economic recession | |

Remember this

To help you remember this case study, make notes under the following headings:

The demographic transition model

Demographic transition of Germany

Demographic transition of Mauritius

Comparison between demographic transition of Germany and Mauritius

You can use the space below to make your notes.

Remember some of the factual detail for Mauritius and Germany so that you can use them as examples in your examination answers.