

Chapter 4

DEMOGRAPHIC TRANSFORMATIONS

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Topics covered

- The geographies of population growth
- Changes in life expectancy and fertility
- Population projections
- Migration
- The geography of disease, natural disasters and wars
- The challenges of an ageing population in Europe

4.1 Introduction

Demographic processes are relevant to almost every topic discussed in this book. For example, changes in population size and structure can have an impact on the environment (including consumption patterns that affect climate change) as well as on the economy of countries and regions. They may also influence the formation of government policies and strategies at all geographical levels. Events such as environmental disasters, wars, economic shocks and rising inequality can alter a whole populations' life expectancy and lead to significant demographic shifts. This chapter draws on recent work by the authors (Dorling, 2013) to explore the geography of global population growth trends and processes, it also presents traditional demographic concepts and models that were developed to better understand such processes (drawing on and updating relevant sections in earlier versions of this chapter written by John Round, 2010). Further, we critically reconsider such models in the context of a global environment where countries, regions and cities and their populations

are increasingly interdependent and at a point when there are growing numbers of people moving over national and international borders. We also discuss more recent events and demographic transformations in the context of official population projections that suggest world population is now stabilizing. The chapter then considers case study examples where factors such as wars and environmental disasters can be seen to be strongly associated with demographic processes and can have a significant impact on the population structures of many countries and within countries. The chapter concludes by providing a summary of the issues discussed and also a brief discussion of the impact of income and wealth inequality upon life expectancy (which in recent years in Europe and the USA have been exacerbated for some groups of the population by the implementation of austerity measures that disproportionately affect them).

4.2 Geographies of population growth

Before 1851 the world's population experienced relatively slow growth for most of human history, with the exception of the period that is known as the Neolithic revolution (which is thought to have taken place around 11,500 years ago). In particular, just before the Neolithic revolution, which is also known as the Agricultural Demographic Transition, the global population of humans has been estimated to have been around 6 million people, with a huge amount of error associated with that estimate. According to estimates of the United Nations Population Division (see Figure 4.1) the global population in year zero (just over 2000 years before today) was estimated to have been around 300 million. However, other estimates of the world population at that time vary between 170 and 400 million. Up to the end of the first millennium the world's average population growth rate was under 0.1 per cent. During the second millennium population growth rates were slow and at times of plague and the spread of diseases to the new world they were negative, but despite such setbacks the global human

population reached one billion in 1820. From then it went up to 1.3 billion by the early 20th century and then rose rapidly to a staggering 6 billion by 1999. On 31 October 2011 the United Nations declared that the global population reached 7 billion¹. Figure 4.1 shows how the population changed throughout the last two thousand years.

Table 4.1: World population 0-2011 (in billions),

| Year | Billions |
|-------------|-----------------|
| 0 | 0.30 |
| 1000 | 0.31 |
| 1250 | 0.40 |
| 1500 | 0.50 |
| 1750 | 0.79 |
| 1800 | 0.98 |
| 1850 | 1.26 |
| 1900 | 1.65 |
| 1910 | 1.75 |
| 1920 | 1.86 |
| 1930 | 2.07 |
| 1940 | 2.30 |
| 1950 | 2.52 |
| 1960 | 3.02 |
| 1970 | 3.70 |
| 1980 | 4.44 |
| 1990 | 5.27 |
| 1999 | 5.98 |
| 2000 | 6.06 |
| 2010 | 6.79 |
| 2011 | 7.00 |

(Source: United Nations Population Division, 1999; Population Institute, 2011)

The figures above and discussion of world population growth do not tell us anything about the geographical distribution of that growth. We can explore the changing geography of the global population with the help of maps and cartograms from the Worldmapper project (see

¹ <http://www.un.org/apps/news/story.asp?NewsID=40257#.VTvNHIGqqko>

useful web-sites). In the context of this project the world is categorised in 12 Worldmapper regions, which are geographically contiguous territories of population groups (containing at least one hundred million people per region) classified by the UN Human Development Index and colour coded accordingly, with different shades for individual countries. Visit the Worldmapper website for a further explanation of the regional definition. Using a rainbow scale, ranging from violet for the best-off region (consisting of Japan alone) to dark red for the poorest region comprising countries in the centre of the African continent. Figure 4.1 presents a series of Worldmapper cartograms highlighting the changing geographies of population growth over the last two thousand years, based on past population estimates (from the Angus Maddison Project; see useful web-sites section for more details).

These maps are cartograms in which the territories are drawn in proportion to their population at the different moments in time. In year one (around when it is thought that Christ was born), the population of what is now China, Mongolia and Korea combined was the same as the population of the United Kingdom today, around 62 million people. Hardly anyone lived in what is now the UK, just enough for it to be worth the Romans invading (a few years after Christ this thought to have died in what is now Israel). The population of what is now India, then at the centre of the (known) world, was, at 78 million, less than that of Germany today. Across all of the rest of the planet the remaining 90 million humans were unevenly spread out. As can be seen in the first cartogram, the largest territories in the cartogram are China (coloured in bright green) and India (coloured in orange), where an estimated 135 million people, more than half of the then total global population, were thought to live. At that time there were 40 million people in Europe, 18 million in the Middle East and 11 million in Northern Africa, whereas North and South America as well as Asia Pacific were very sparsely populated. Generally the colder areas in Northern latitudes tended to have lower

populations whereas the territories that now encompass the Ganges, Tigris, Yangtze, Nile and Po rivers were the most populous.

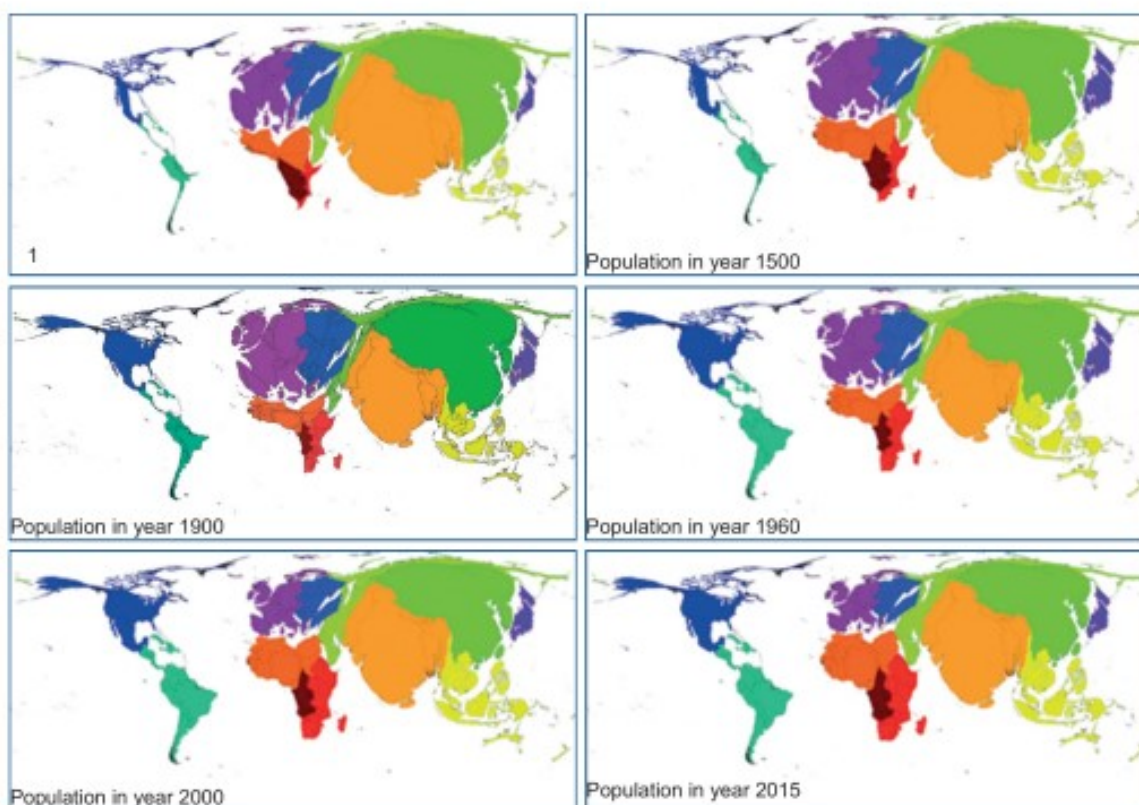


Figure 4.1 The geography of population growth by Worldmapper regions (worldmapper.org).
Source: cartography by Benjamin Hennig (viewsoftheworld.net).

The second map in the figure shows the distribution of the population in year 1500, the time of the Spanish conquest in South America. Although the global population nearly doubled from year 1 to year 1500, its geographical distribution remained largely the same, with Southern and Eastern Asia remaining the most populous world regions. It is also interesting to note that at this time the combined population of Mexico and Peru was greater than the total of the land now labelled as all other American countries. This pattern was about to change in the following centuries. In particular, the encounter of the New World in 1492 was accompanied by the exposure of its inhabitants to germs and illnesses to which they did not

have immunity. This had a devastating effect upon the indigenous population that died far faster from those diseases than from the colonial wars and atrocities committed by the Old World powers (Mann, 2011; Diamond, 1997; Dorling, 2013). Back across the Atlantic, the shock was so great that the economy of the Old World was transformed; riches plundered from the New World turned the social order of continents on their head. The underdeveloped far west of Asia (called Europe) suddenly became the centre of the world; and suddenly China was peripheral. Trade flows altered, colonization began, the taking of slaves accelerated in Africa and for most people in the world within a few centuries everything that was solid had melted into air. From continent to continent human populations began to multiply rapidly as the established social orders were overturned. The first, fastest and most destabilizing population explosion was within Europe itself. Africa was depopulated through both slavery and 400 years of forced migration, mostly to the New World. India was colonized (twice), Chinese empires were destroyed, partly through the British Empire-orchestrated opiate trade. A nascent North American empire was conceived. Between 1500 and 1900 the global population tripled to 1.5 billion and the geographical distribution changed significantly, as shown in the third map. During this period, which was characterised by imperial rule and territorial expansion, the populations of Britain and North America increased more than ten-fold. The fourth map in the series reproduced here shows the geography of the global population in 1960, when it reached three billion. South America has increased its proportion of the world's population living in that continent rapidly since 1900. In contrast, the Western European proportion of the world population began to decline in relative terms in 1900 when it was 15 per cent, to 11 per cent in 1960 and then 6 per cent in 2000. The fifth cartogram shown in Figure 4.1 portrays the geographical distribution of the estimated 6.2 billion global population in 2002, two years after it reached 6 billion, whereas

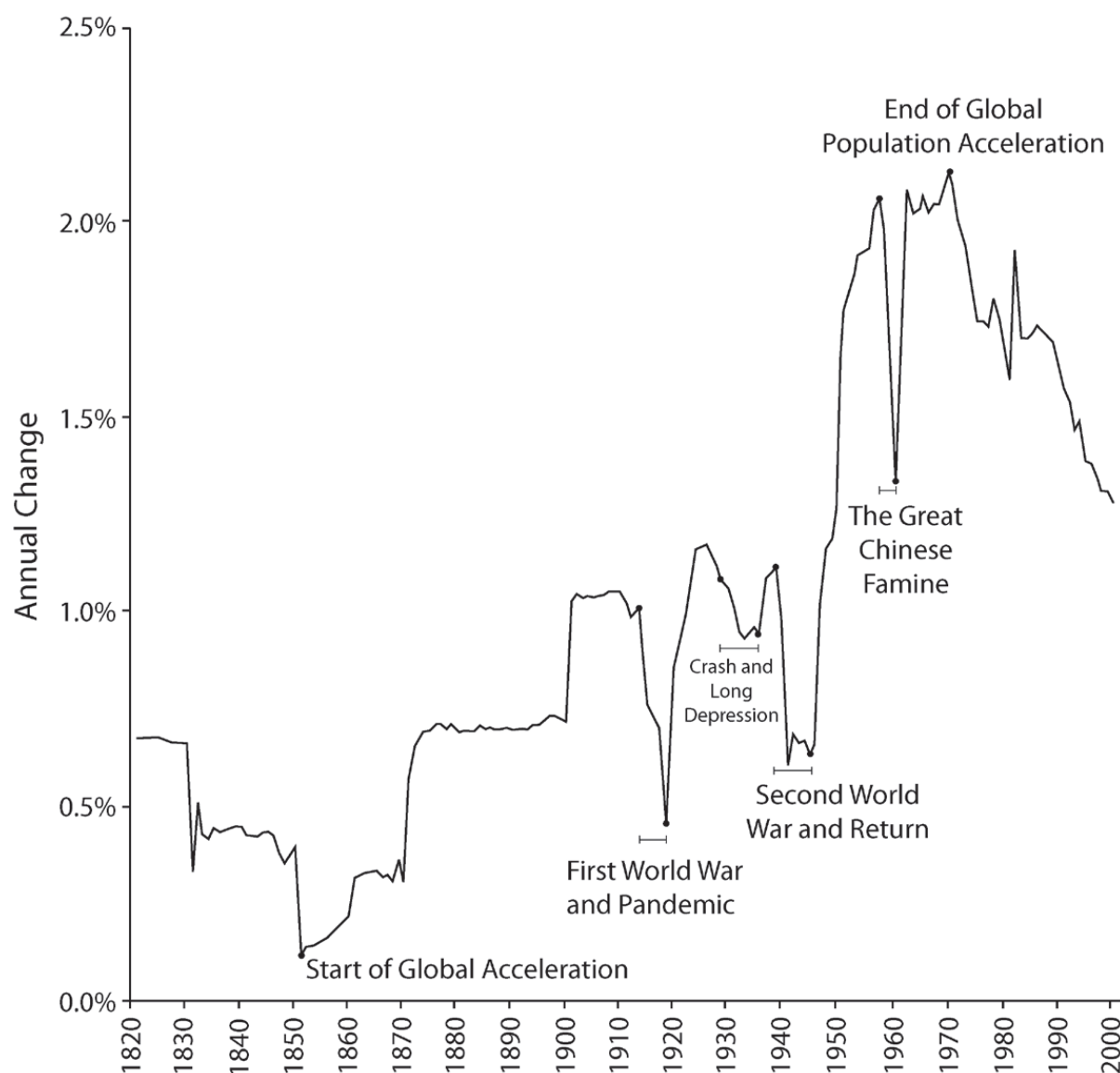
the sixth and last cartogram shows how the 7.3 billion people in 2015 are geographically distributed in our own time.

As noted above, after a long period of stability there was a great demographic change. A key milestone was 1820 when the world population reached 1 billion. It can be argued that this change was the long-term result of the encounter between the Old and the New World in 1492, which led to a new demographic transition and a new human equilibrium as described above, and as will also be discussed in more detail in the next sections of this chapter.

The 120-year period between 1851 and 1971 is charted in Figure 4.2 and is known as the era of global population acceleration. After 1851 the population was not just growing, **the growth itself was growing!** In particular, the rate of global population growth experienced a rapidly increasing trend itself throughout this period with the notable exceptions of periods associated with the two World Wars and a small number of other significant events. The world's average population annual growth rate rose from 0.1 per cent to over 0.5 per cent between 1851 and 1900 and went up to over 1 per cent in the beginning of the 20th century, with the brief drop to 0.3 per cent during the First World War and the influenza pandemic that followed (1918-1919). It then went up to 1.3 per cent during the 1920s, before falling again to 0.8 in the era of the Great Depression from 1929 to 1936. It then briefly rose to just over 1 per cent again in the late 1930s, before falling dramatically during the Second World War. After that first truly global war there was a further and rapid acceleration to 1.8 per cent by the mid-1950s, briefly interrupted in the three years of the Great Chinese Famine (between 1958-1961, when up to 45 million premature deaths occurred) and peaking at 2.1 per cent in 1971. The period of global population acceleration ended in that year and annual growth fell to 1.6 per cent in 1982, jumped to 1.9 per cent in 1983 and has been falling continuously

since then. It should be noted that all these increases are compound (the annual increase are in addition to previous growth) and therefore a growth of 2 per cent means that the world population doubles every 35 years – if that rate continues.

World Annual Human Population Growth 1821–2001



Source: Angus Maddison's historical datasets.

Figure 4.2: World Annual Population Growth 1821-2001

The review and analysis of past trends in population growth can be used by demographers in order to try to project what the future population growth rates might be. In countries without population registers, such as the UK and USA, the population census, which records demographic and socio-economic information at a single point in time and is normally carried out every ten years (Rees et al., 2002), is an essential instrument that is used in order to obtain reliable estimates of population numbers. Censuses were taken in ancient times by kings, pharaohs and emperors to estimate the size of the population they had to keep suppressed and the number of soldiers they could raise, as well as to estimate their tax base. However, the first modern-day repeated census taking took place in Prussia in 1719 and in the USA in 1790, whereas the first census in Britain was not held until 1801. Census datasets describe the state of the whole national population and are extremely relevant for the analysis of a wide range of socio-economic issues and related policies. In addition to the census there is an increasingly wide range of administrative and private sector sources of suitable socio-economic data that can be used for demographic research.

The data collected from censuses of populations can be used in order to provide estimates of population in the past as well as projections into the future. In particular, once a census is taken, it is possible to calculate birth and death rates and once these rates are calculated it becomes possible to project population numbers both backwards and forwards in time, including estimates of future and past migration flows.

On the basis of the past demographic trends reviewed above it is expected that in coming decades the global population growth rates will continue to decline, as they have for the last four decades. In particular, the United Nations predicts a fall in growth rates to below 1 per cent by around 2020, declining further thereafter to 0.3 per cent by 2050 (which will be the

lowest growth level recorded since the mid-eighteenth century). However, even these more modest growth rates will see the world's population grow by over 35 million a year until 2050. Even such slowed growth results in an overall population of 9.5 billion, 2.5 billion more than present. Given the compound nature of population growth, as we shall see below, it takes only small changes in fertility/death rates to have major consequences for population totals over a long period. However, it is population ageing that will be responsible for most population growth in come decades, but high fertility would alter this. Thus, as Figure 4.3 shows, the UN produces a range of predictions based on different fertility rates for 2050, with those made in 2012 ranging from 8.3 billion to 10.8 billion.

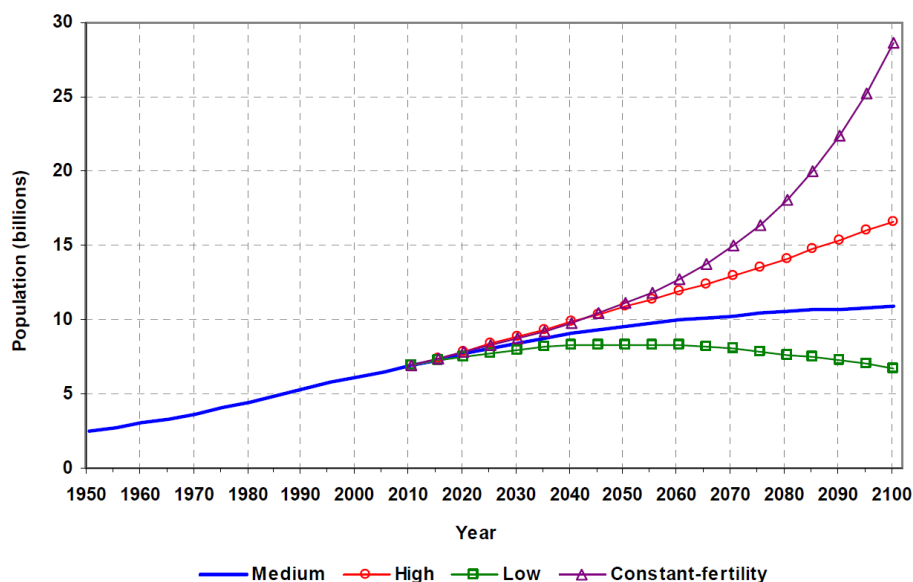


Figure 4.3: How changes in fertility rates might impact on future population growth (Source: World Population Prospects: The 2012 Revision. New York: United Nations)

It is instructive to break down the UN estimates and predictions by country and world regions. One of the classifications used by the UN to classify world regions and countries is that of 'more 'developed countries' or 'less developed countries' which, as is discussed in Chapter 8 is problematic; nonetheless these terms are used in this chapter (as well as other

socio-economic and political classifications), as they are routinely and widely employed by organisations such as the UN and the World Bank. Figure 4.4 shows the official UN estimated past and projected future growth rates in so called ‘more developed’ and ‘less developed’ countries. As can be seen, population size in the ‘more developed countries’ has remained relatively stable since the late 1950s, at around 1 billion. In contrast, the total population of the ‘less developed countries’ has increased rapidly from approximately 1 billion to 5 billion since 1950.

This difference in growth rates is depicted starkly in Figure 4.4, which shows that the rates of population growth in less developed regions, although declining rapidly, will continue to be far above those in more developed regions for the foreseeable future. The most striking aspect of the geography of population change is how population size in the ‘more developed countries’ has remained relatively stable since the late 1950s, at around 1 billion. In contrast, the total population of the ‘less developed countries’ has increased rapidly from approximately 1 billion to 6 billion since 1950. Also, as can be seen in Figure 4.4, the rates of population growth in ‘less developed regions’ are projected to be far above those in ‘more developed regions’ for the foreseeable future.

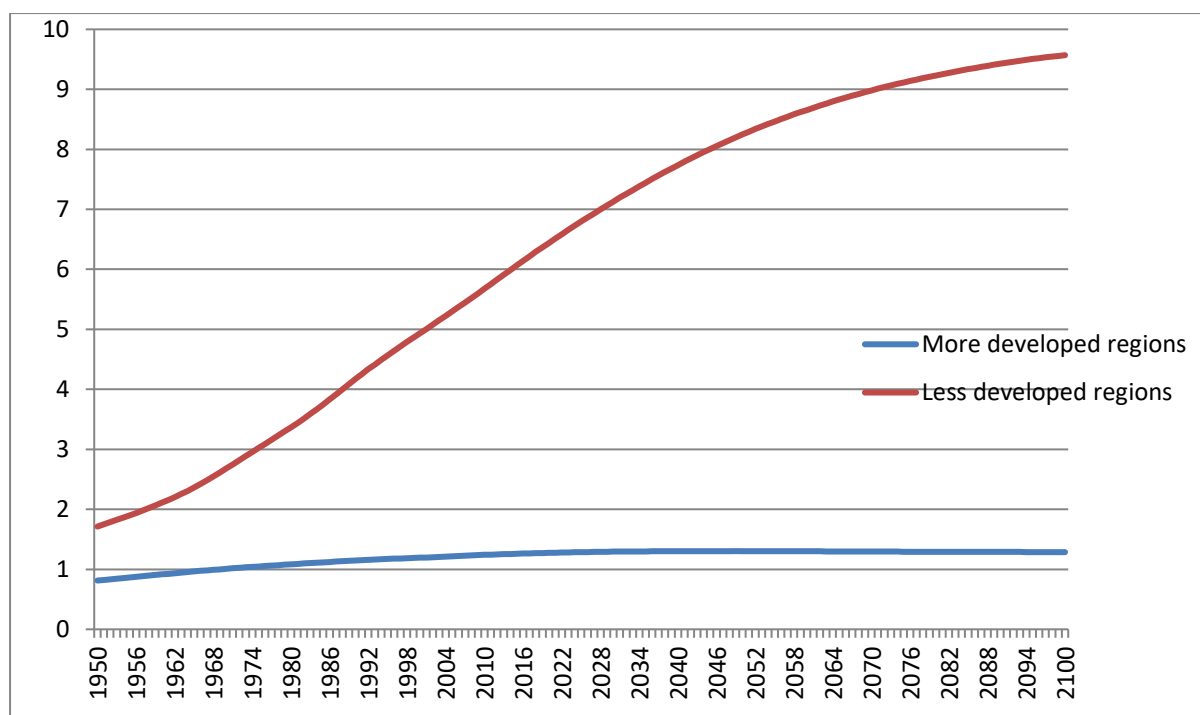


Figure 4.4: Population growth by more and less developed countries (in billions); Source: Source: World Population Prospects: The 2012 Revision

Even within the category of ‘less developed’ there are still further variations, the reasons for which will become more apparent below. The 48 least developed countries, according to UN data, experienced the greatest increases in population growth. This group only held 8 per cent of the world’s population in 1950 but in the subsequent half-century, as a result of their rapid population growth, they contributed around 15 per cent of the overall global growth. Such differences in population growth rates have altered the relative distribution of the world’s population. For example, the ‘more developed’ countries in 1950 combined to provide approximately a third of the world’s population, by 2010 this had fallen to around 18 per cent (this global shift is discussed in Chapter 5 in relation to global energy demand and carbon emissions). As Table 4.2 shows, this has meant that significant changes have occurred in overall population share by region. Consequently, as Table 4.2 demonstrates, Europe’s share of the world’s population fell from approximately a quarter to around an eighth between 1900

and 2000, with Africa contrasting most as the biggest continental gainer in percentage terms.

What is most significant here is how this has happened, with most of the changes taking place since 1950.

By 2050 Europe's share of the world's population is likely to have fallen to 7 per cent, while Africa's share is expected to be nearly three times that. Over the period 2003–2050 Africa's population is projected to grow by just under one billion people, representing over one-third of all global growth in humanity (36.4 per cent) compared to only one-sixth (16.6 per cent) for 1950–2003. Meanwhile, Asia seems destined to remain the main contributor in absolute terms, adding a further 1.4 billion up to 2050, but this is a marked reduction in the pace of growth compared to its 2.4 billion gain between 1950 and 2003.

Table 4.2 Changes in overall population share (%) by region

| Major area | 1950 | 1975 | 2010 | 2050 | | | |
|--|------|------|------|------|--------|------|----------|
| | | | | Low | Medium | High | Constant |
| <i>More developed regions</i> | 32.2 | 25.7 | 17.9 | 13.8 | 13.6 | 13.5 | 11.4 |
| <i>Less developed regions</i> | 67.8 | 74.3 | 82.1 | 86.2 | 86.4 | 86.5 | 88.6 |
| <i>Least developed countries</i> | 7.7 | 8.5 | 12.1 | 19.1 | 19.0 | 18.8 | 23.0 |
| <i>Less developed regions, excluding least developed countries</i> | 60.1 | 65.7 | 69.9 | 67.1 | 67.4 | 67.7 | 65.6 |
| <i>Less developed regions, excluding China</i> | 45.9 | 51.3 | 62.0 | 71.4 | 71.5 | 71.6 | 76.3 |
| Africa | 9.1 | 10.3 | 14.9 | 25.4 | 25.1 | 24.7 | 29.0 |
| Asia | 55.3 | 58.6 | 60.2 | 53.7 | 54.1 | 54.4 | 52.3 |
| Europe | 21.7 | 16.6 | 10.7 | 7.5 | 7.4 | 7.4 | 6.1 |
| Latin America and the Caribbean | 6.6 | 8.0 | 8.6 | 8.1 | 8.2 | 8.3 | 8.0 |
| Northern America | 6.8 | 6.0 | 5.0 | 4.7 | 4.7 | 4.6 | 4.1 |
| Oceania | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 |

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat *World*

Population Prospects: The 2012 Revision, United Nations, New York.

4.3 Geographies of changing birth and death rates and the demographic transition model

To explain changes in population growth rates demographers often use the demographic transition model. According to this model there are five stages through which most countries have passed in their demographic history. Figure 4.5 summarises the model and shows the stages (see Lee 2003 for an overview of its development). During stage one, health care is rudimentary and many people die from what are now easily treatable diseases, leading to very high crude death rates (CDR – deaths per 1000 people). Birth rates (CBR – births per 1000 people) were also high as large families were the norm, possibly as insurance against uncertainty and to ensure that parents will have support when they can no longer work. With birth and death rates relatively equal, overall population size does not increase dramatically during this stage.

Countries move to stage two, as their political, economic and social organisation evolves and leads to the development of health care and sanitation systems, so that fewer people die from easily preventable diseases. However, there is usually a period during which birth rates remain high. This might be due to a delayed adjustment to the new situation, or because economic growth sees an increasing demand for family labour. This gap between death and birth rates results in an increasing population. As death rates can fall rapidly this can often cause a rapid rise in population growth. Figure 4.6 demonstrates how this occurs.

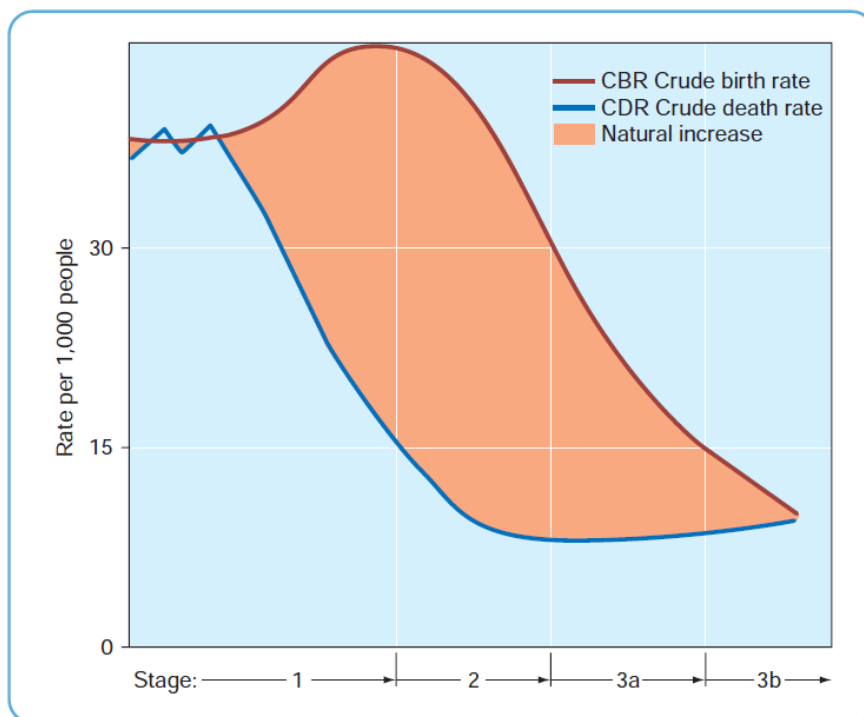


Figure 4.5: The Demographic Transition Model

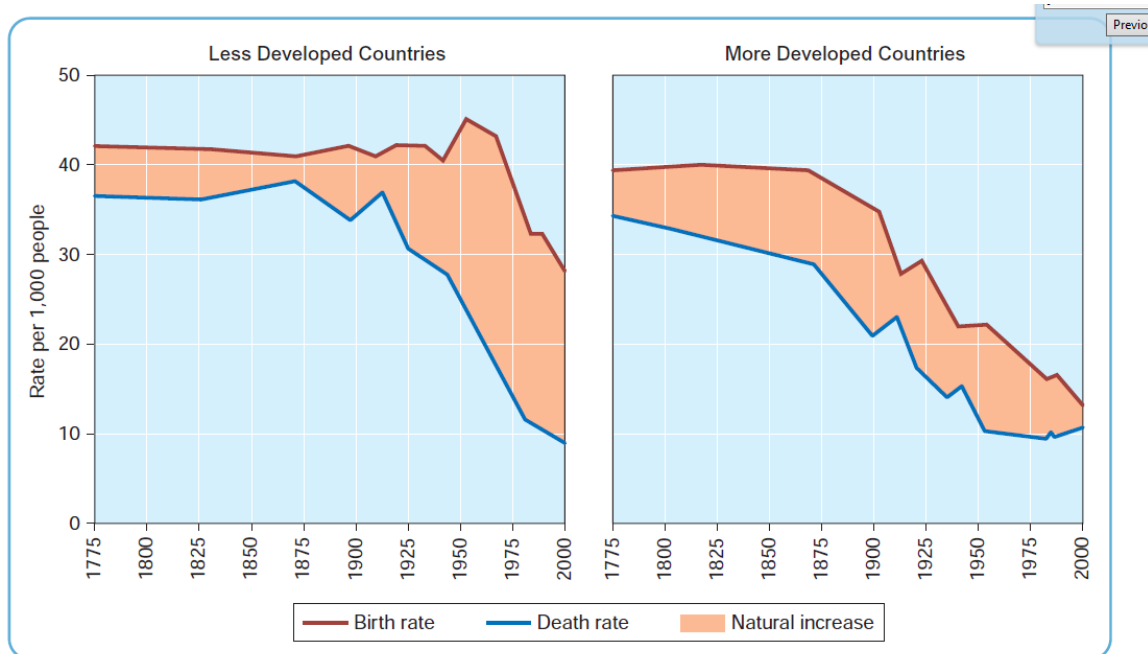


Figure 4.6: How changes to birth and death rates can lead to changes in natural population growth.

From these figures we can see that, in less developed countries, from the middle of the previous century death rates fell dramatically as health care began to improve. However, birth rates, although declining, did not converge with death rates, resulting in a rapid increase in the rate of natural population growth. More developed countries have entered the third stage of the demographic transition model where birth and death rates converge. Birth rates have fallen rapidly for a combination of reasons, including the following:

- The setting up of systems of social security and pension systems meaning that many parents no longer have to rely on their children for support during old age.
- Increased social and economic choices for women, gained by women, these include improving opportunities in the workplace, much greater levels of participation in higher education than in previous generations and the availability of reliable contraception.
- Cultural attitudes towards large families have changed so that rather than being the norm, having many children is seen as unusual and an increasing number of women are deciding not to have children at all.
- Increasing levels of divorce and single parent families means that large families are less likely. It is also far more accepted today to be single for much or all of your life and to be in a same sex relationship, which tends to result in fewer births.
- A rapid increase in the average age of first birth. If the first birth is delayed then a large family is less likely.

A combination of these factors has resulted in a dramatic fall in global fertility rates. In the 1960s fertility rates averaged around 5 children per woman, but have now fallen to below half that figure. The fertility rate today worldwide ranges from 1.2 children per woman in the Republic of Korea to 7.6 in Niger (World Bank, 2015), and the world average fertility rate is now estimated to be 2.5.

In Asia and South America the average fertility rate is still rapidly falling and in almost all cases is below 2.5 children per couple if not below 2.1. In sub-Saharan Africa the majority of countries currently have fertility rates of above 3 or in a few cases 4, and many are beginning to see fertility decline more quickly than before. Figure 4.7 shows how the average fertility rates were falling up to 2010 and are predicted to continue to fall. They are now well below the population replacement rate of 2.1 (the minimum needed for a population not to decline over the long term) in Europe and North America; and they are projected to reach that level in most regions in the world before 2100. The highest fertility predicted by the UNPD for 2100 is 2.13 children per couple in Africa (as a whole). The lowest is 1.93 (which is almost certainly too high an estimate). Many demographers suspect that the lowest rates will be much lower than 1.93 simply because they are lower already.

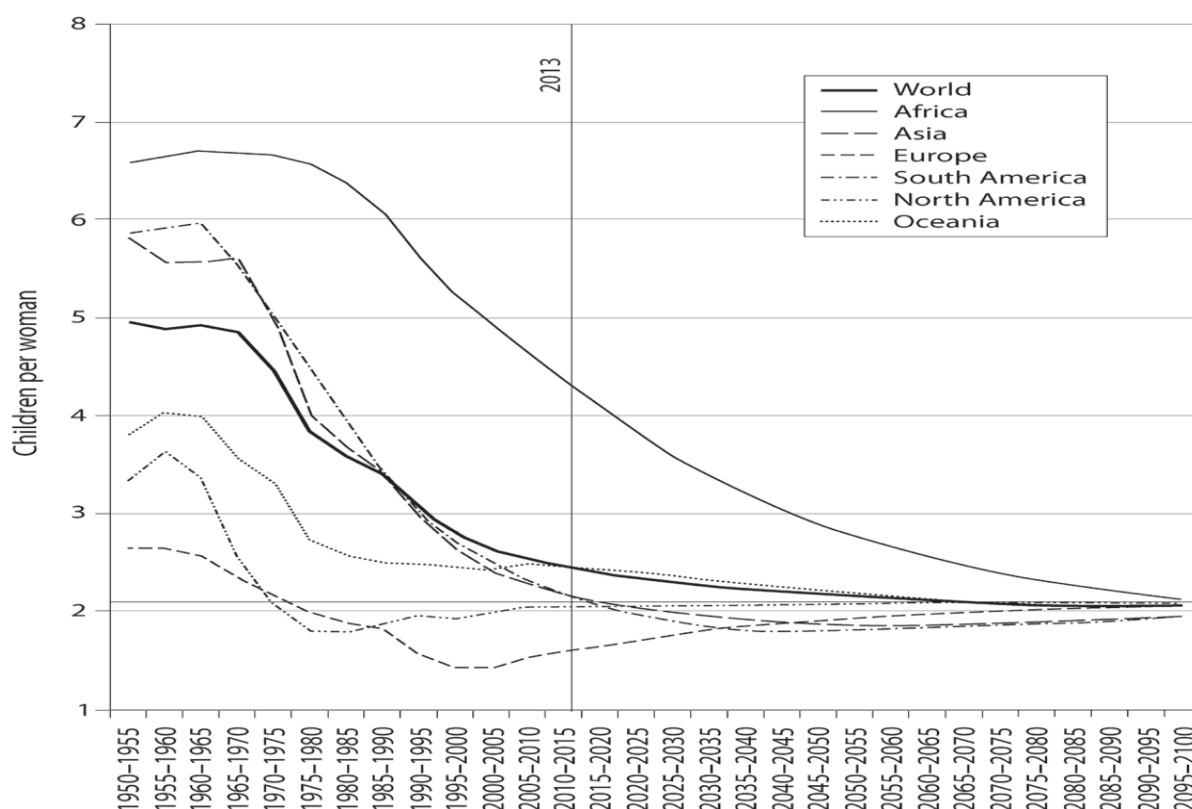


Figure 4.7: Total Fertility 1950-2100

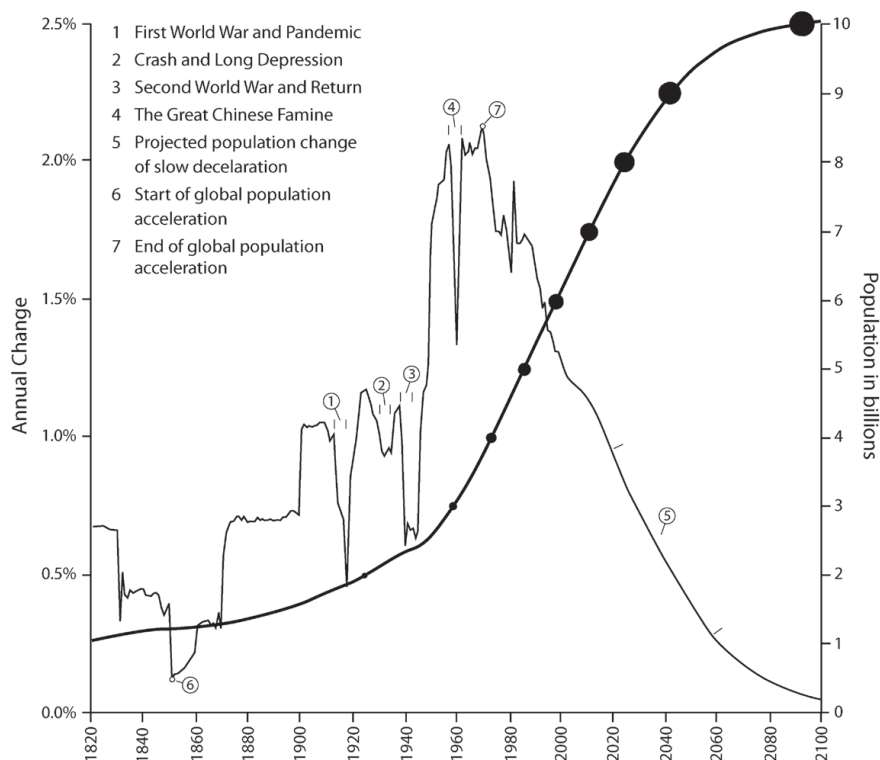
Source: UN historic estimates and projections, 1 June 2011

4.4 Global population growth and punctuated equilibrium

The demographic transition model can help with the analysis and understanding of past trends and demographic processes. However, one of its key limitations is that it does not take into account the inter-dependencies of cities, regions and countries, which need to be considered when analysing past and future world population growth. In this section we draw on recent relevant work presenting an alternative approach to the analysis of global population growth, adapting *punctuated equilibrium* ideas from biology. Discussing further and revisiting the graph shown in Figure 4.2 can illustrate this alternative and more sophisticated model. Figure 4.8 shows an extended version of that graph, adding the total population numbers as well as projections to 2100. The period from 1851 to 1971 can be described as an era of global population acceleration (barring the four epochal events annotated in both figures). The year 1851 can be described as a global minimum for recent population growth. Looking at our recent past, in Figure 4.8, in relation to what our near future is projected to be, we can clearly see that we have been living through a major demographic transformation. However, global population change started to decelerate in 1971 and has continued unabated since then. Currently the population growth (thin) line in Figure 4.8 is still dropping almost as quickly as it did in the 30 years up to 2000, although you can see a slight 'hump' of baby boom just around 2010 if you look carefully. Annual global population growth was 1.27 per cent in the year to 2000; it fell to 1.03 per cent by the year to 2009. That is a continuous rapid decline in growth rates. It is made up of many slightly greater decelerations and a few slower ones (including the 2010 mini baby boom). The Netherlands saw growth rates fall from 0.67 per cent to 0.42 per cent over the same period, the United Kingdom 0.39 per cent to 0.28 per cent (although growth there has been rising in very recent years but only due to a mini baby boom among the children of recently

arriving migrants), in Spain population growth rates fell from 0.16 per cent to 0.08 per cent and are now negative (as we write in 2015); in Italy, growth of 0.2 per cent in 2000 has declined so fast that it became a fall of 0.03 per cent even as early as 2009, in Germany a 0.14 per cent rise turned into a fall of 0.5 per cent and in Japan a 0.19 per cent rise became, in just 10 years, a fall of 0.16 per cent, all this in the years 2000 to 2009. All this before the greatest economic slump since 1929 set in with its rapid effects on curtailing fertility even more quickly. United Nations data in 2015 still refers to estimates revised in 2012. As yet we do not have a full picture who how global economic recession has impacted on fertility and mortality. By the time you read this we should know. So if you want to know what has happened look forward updates and see: <http://esa.un.org/unpd/wpp/index.htm>

World Annual Human Population Growth and Level (1821–2100).



Source: Angus Maddison's estimates 1821–2000 and the UNPD 2011 based projections 2001–2100.

Figure 4.8: World Annual Population Growth and Level – 1821-2100

In revised biological theories of evolution, the concept of the punctuated equilibrium is used to describe whole sets of species suddenly dying out and new ones emerging. This is usually following a period of general stability before another period of quiescence (which means stability, quiet and stillness) establishes. In general there is equilibrium. All that changes during the quiescence are the mechanisms that tend to operate to preserve the status quo, to bring events back into line. However, occasionally and very rarely, that equilibrium is punctured and there is great and rapid change. That is what has happened to human beings; there has been a rapid change in our numbers since 1492, a change so great that it has only been seen once before – a very long time ago.

Many millennia ago the ecology of interacting groups of humans evolved after the Neolithic revolution, itself a great puncturing, to become what, in 1990s terminology, was called a self-organized critical steady state; in this case a state of gently rising population numbers interspersed with the occasional plague or famine. However, when one particular group of humans adapts, and jumps across some barrier, such as the Atlantic Ocean, that group mutates to a different kind of human society, and this eventually affects all other human groups on the planet. All their equilibria are punctured.

At first the effects of humans regularly crossing the Atlantic were hardly noticeable, if you just considered average global statistics. The World's population had fallen slightly in the years immediately after 1492 as deaths in the Americas spread with the introduction of Old World germs and diseases. However, globally, annual population growth rates rose to a quarter of a percentage a year from 1500 to 1600, next falling to just 0.08 per cent on average from 1600 to 1700, but then rising to just under half a percentage growth a year, on average,

between 1700 and 1850, after which the puncturing of the equilibrium finally resulted in all human groups in every continent growing quickly.

Different groups are influenced most strikingly by events outside of their control at different times. For example, the populations of the Americas were decimated many times over; from shortly after that first modern Atlantic crossing was made.

It is hard to tell what occurred around 1851 to cause that date to be the global minimum for recent population growth. It may well have been a combination of factors. Some may have been technological, including the slow and benign spread of electricity that aided people to read and learn after dark. Some were political, such as the immediate and dramatic effects of the 1848 year of revolution spreading across Europe, and how that led to so many of those in power realizing that they could not continue to treat others beneath them almost as slaves.

The nineteenth-century population acceleration could also partly be related to the understanding and control of diseases stemming from overcrowding, poverty, and unsanitary living, as well as the introduction of condoms (which became widely popular in North America in the 1840s before they were widely used in the UK). It is not impossible that just as it took a great deal of birth control to later put on the brakes, just a little birth control had earlier enabled the conditions for some (then) more sustainable growth to become established.

The discussion above of possible reasons for the acceleration that began in 1851 and had its source as early as 1492 provides just one of many possible explanatory frameworks for demographic transformations. Similarly, we can consider possible reasons that might have

caused the slowdown in 1971 that now looks as if this was not just another of those events brought on by a catastrophe (as annotated in Figure 4.8), but what we now see clearly as a turning point. Reasons for our current slowdown can include the gradual and benign spread and multiplication of vaccines that has greatly reduced infant mortality, to the immediate and dramatic effects of the 1968 uprising across the rich world and that led to so many in power coming to see that there were limits to endless growth (it is notable that the Club of Rome was formed that year). In addition, other potential very important reasons include the work that was done that resulted in understanding and spreading education, especially to women, the spreading by word of mouth of the invention and availability of the contraceptive pill, widespread use of which began in North America in the 1960s, through to seeing, for the first time, the earth from the moon in 1969. There are numerous possibilities for what it was that caused the tide to turn shortly after 1968. It is highly likely that without effective and widespread new forms of contraception, human beings would not have managed to limit their numbers once the great change began in 1851 and there could have been demographic developments similar to the predictions and consistent with the views (which were proven completely wrong and unjustified, especially about future population growth) of Reverend Thomas Malthus who, in his *Essay on the Principle of Population* (published in 1798), forecast a never-ending cycle of population growth, war and famine.

But other factors mattered: vaccination, student uprising, limits to growth theory, and – perhaps of far more importance than all of these - women’s emancipation. What all these have in common is education. And education was not just widespread by the 1970s; it was about to boom. In particular, it can be argued that the punctuated equilibrium settling back down again to ordinary equilibrium is occurring through our collective learning. By 1995, a majority of working-age people in the world, those aged 15–64, had been educated to

secondary level. Less than a third had been so educated in 1970. It was only in 2007 that it became clear just how quickly educational improvements were spreading, and that these figures could be confirmed as changing so quickly (Lutz et al., 2007 – see Figure 4.9). This global educational improvement is remarkable and to date shows no signs of slowing down, despite, or perhaps because of, the beginnings of the deceleration in population numbers. As people all around the world have far fewer children, more and more work harder to ensure that their offspring are better educated than they were.

A recent projection (Samir et al., 2010) of educational changes has suggested that future trends for India and China will result in the numbers in any form of education in India not peaking until 2050, but the absolute numbers in various categories of learning falling in China from 2020 onwards. This will occur as the numbers of young people most likely to attend educational institutions continues to fall there even as the proportion attending higher education rises. The report accompanying the projection ends with the following salutary note: ‘A historical example is provided by South Korea. In the 1960s, based on historical growth data, the economic outlook would have been modest, but projections of its future educational attainment profile may have indicated that it was about to enter a window of opportunity combining high qualifications with low dependency ratios’(Samir et al., 2010). When the rapid current uptake in educational opportunities is taken into account, then an even more rapid future population slowdown would appear yet more likely in both India and China. Women in particular tend to have fewer children when educated to secondary level, and fewer still if university educated. Figure 4.10 shows the highest level of education achieved or projected to be achieved by adults in India and China. Children are not included in these figures. Even in countries as affluent as the United States, educational changes are still linked to fertility changes.

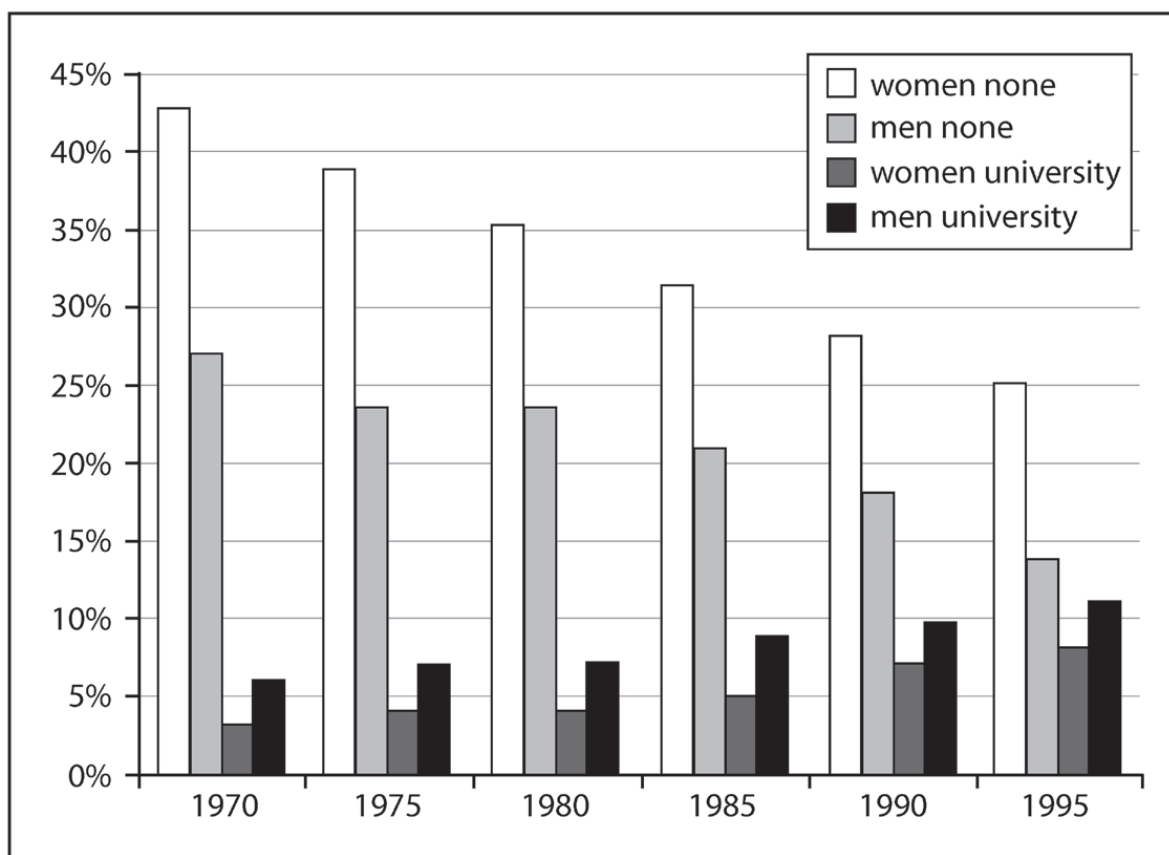


Figure 4.9: Men and women at university and with no qualifications, worldwide, 1970-1995

Source: L Lutz, W. Goujon, A., Samir, K.C. and Sanderson, W. (2007), Vienna Yearbook of Population Research 2007

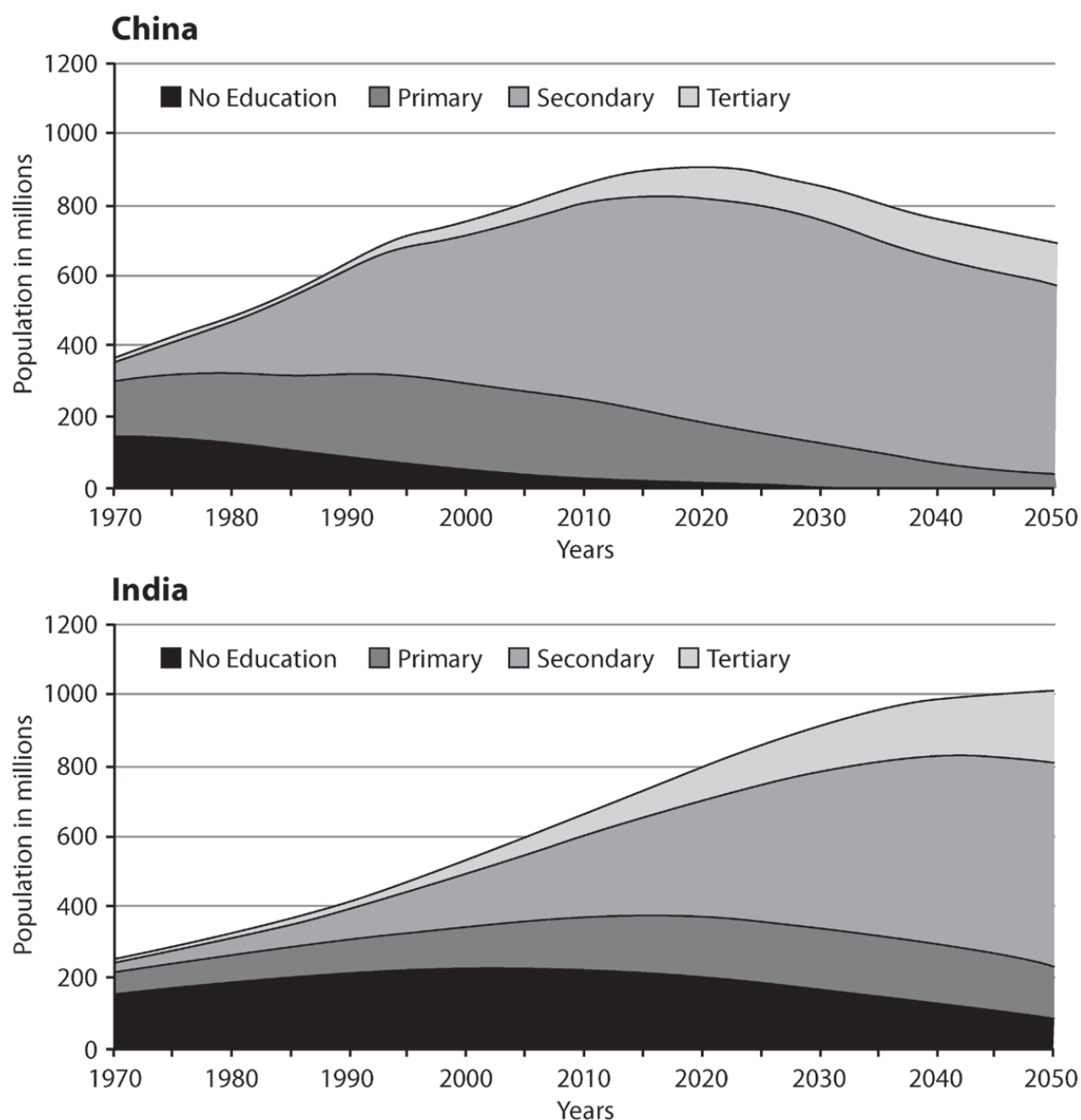


Figure 4.10: Population by education level 1970-2050
 Source: Samir, K C, Barakat, B, Goujon A, et al. (2010, p.432), ‘Projection of populations by level of educational attainment, age and sex for 120 countries for 2005- 2050’, Demographic Research 22, 383-472, <http://www.demographic-research.org/volumes/vol22/15/>

4.5 Migration and population change

A world in which fertility’s contribution to population growth is declining will see future population change within any region and country being attributed far more often to migration. In addition, there is an increasing movement of people between regions and countries so these patterns are changing. As the world urbanizes, more will move more often and further. Far more often than before those moves

will be over international borders, simply because it has become easier to move slightly longer distances (and to video-call back home), while the number of borders tends to remain fixed.

Table 4.3: Number of people born in a country other than that in which they live % of population

| International migrants (% of total population) | 1960 | 1980 | 1990 | 2000 | 2010 |
|---|-------------|-------------|-------------|-------------|-------------|
| World | 2.4 | 2.1 | 2.9 | 2.9 | 3.1 |
| <i>By supra-national membership grouping</i> | | | | | |
| Arab World | 3.6 | 5.9 | 7.0 | 6.4 | 7.4 |
| Euro area | 2.3 | 3.5 | 6.4 | 8.4 | 10.9 |
| European Union | 2.8 | 3.6 | 5.7 | 7.3 | 9.4 |
| <i>By Human Development Index, income category and other status</i> | | | | | |
| Fragile and conflict affected situations | 3.9 | 4.3 | 3.5 | 2.7 | 2.6 |
| Heavily indebted poor countries (HIPC) | 3.9 | 3.6 | 3.5 | 2.6 | 2.1 |
| Latin America & Caribbean (developing only) | 2.7 | 1.6 | 1.5 | 1.1 | 1.1 |
| Latin America & Caribbean (all income levels) | 2.8 | 1.7 | 1.6 | 1.2 | 1.2 |
| Least developed countries: UN classification | 2.8 | 2.3 | 2.2 | 1.6 | 1.4 |
| OECD members | 3.9 | 4.6 | 6.0 | 7.6 | 9.0 |
| High income | 3.7 | 4.9 | 7.7 | 9.4 | 11.2 |
| High income: non OECD | 1.9 | 3.9 | 11.6 | 12.5 | 14.2 |
| High income: OECD | 4.1 | 5.1 | 6.8 | 8.7 | 10.5 |
| Upper middle income | 1.0 | 0.7 | 1.2 | 1.1 | 1.1 |
| Lower middle income | 2.7 | 1.6 | 2.0 | 1.5 | 1.3 |
| Low & middle income | 1.8 | 1.2 | 1.6 | 1.3 | 1.2 |
| Low income | 2.6 | 2.1 | 2.0 | 1.6 | 1.4 |

Source: authors' calculations using data from the United Nations Population Division and The World Bank, 2015.

According to recent data from the World Bank and the United Nations, approximately 3 per cent of the global population (213 million people) in 2010 lived in a country different from their country of birth. This compares to 2.4 per cent (72 million) of the total global population having permanently crossed a border in 1960. Table 4.3 shows the trends from 1960 to 2010 for the world as well as selected major regions and political and socio-economic groupings, whereas Figure 4.11 shows the changes over this period of 50 years for world regions by income level (as classified by the World Bank).

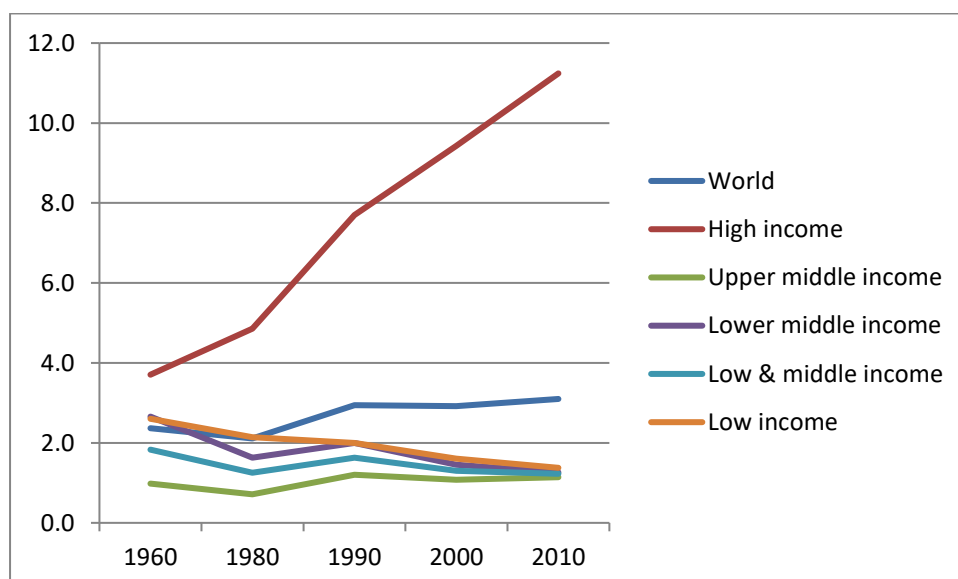


Figure 4.11: Trends (global and by income region) between 1960 – 2010 of number of people born in a country other than that in which they live as a percentage of total population (Source: authors’ calculations using data from the United Nations Population Division and The World Bank, 2015)

As can be seen in Figure 4.11, the number of immigrant residents as a percentage of total population tends to be higher in more affluent countries with nearly 12 per cent of the population in the high income countries (as classified by the World Bank) were born abroad (in 1960 it was 3.9%). This can be attributed to ‘pull factors’ in such countries such as better job opportunities or higher pay rates, but it should also be noted that immigrants themselves contribute to the economic growth and prosperity

of the destination countries. And destination countries often actually desperately need immigrants to replace the babies that have not been born as fertility declined rapidly two or three decades earlier. However, this is often an unfair trade. In particular, immigrants bring in skills, but have been educated at the expense of the taxpayer in their home country. This is the case even with those who may be unskilled or have no formal education qualifications, as when they are employed they paid contributions to social insurance and pension schemes and in many cases they are doing jobs that existing residents do not want to do. Migrants also bring benefits in non-monetary ways that are more difficult to quantify, as they expose their new country to different cultures.

Overall, there needs to be a change of thinking towards understanding that just as gaining migrants is usually positive, for the migrant leaving a country is often a positive move too. In particular, the conditions in destination countries are generally good and this applies to both poorer countries and within the richer world. The large majority of migration in the world occurs where the large majority of people are, in the poorer areas of the world. Often called south-south migration, this is when people leave one country within a continent such as Africa to move to another, usually neighbouring, country. Such moves are can be viewed as problematic: 'The assessment of development progress is based on measurements within national boundaries. The emigration of people is still seen as a symptom of development failure' (Bakewell, 2011). Similarly, emigration to the rich world is often seen as a failure of immigration control, rather than a success story of mass human endeavour. This also applies to situations where people are forced to leave their homes and become refugees as well as economic migrants, as is the case with the recent events, and in the Mediterranean sea which is often seen as a failure of immigration control rather than an opportunity to celebrate humanity, offering a better future to those in need and at the same time benefiting European countries with their rapidly ageing populations (also see section thematic case study 4.3 and section 4.8).

It should also be noted that it is more sustainable to build up population where there is already infrastructure, an abundant water supply, flat land and a demand for new labour, as compared to

where many of these things are lacking. For existing cities that see their populations expanding often the only way is up, and more apartments are the future. For example, it would make little sense for Europe and Japan to depopulate. If migration to them from poorer areas were to increase, their population growth would help slow down total world population growth even faster than it is already slowing, possibly resulting in a global population which never exceeds 9 billion (because fertility falls faster than predicted). It should also be noted that when people move countries they, or their children, tend to quickly adopt the fertility rates of the places they are moving to. However, these facts tend to be overlooked in debates about migration in developed countries and especially by the tabloid press that publish misleading and alarming stories about ‘immigrants taking our houses, our school places and our hospital beds’ (Rowe, 2014) and by far-right political parties (especially in Europe) which – just as their fascist forebears did, use immigrants and people seen as different (such as the Jews) as a scapegoat, blaming them for the rise of unemployment and representing them as a threat, when in fact, as argued above, the overall impact can be extremely positive, especially when societies are properly prepared to welcome them. For more discussion, arguments and examples of why and how migration is beneficial to host countries see Rowe, 2014.



Plate 4.1 A Greek Coastguard ship having picked up refugees who have crossed from Turkey to Europe near Mytilene, Lesvos on 11 June 2015. Lesvos is now a hotspot for migrants.

(Shutterstock)

4.6 Geographies of mortality and life expectancy

One of the key messages of the discussion above is that there has been a significant improvement of life expectancy across the world over the past 200 years and that unless there is a terrible disaster, a new plague or widespread famine, examples of where whole countries experience life expectancy below 50 years should soon be relegated to the historical record, along with examples of countries where the average couple has four or five children.

According to the most recent data from the World Bank, the global population life expectancy at birth in 2013 was 71 years. Figure 4.14 shows the trends from 1960-2013 for world regions (using geographic, economic and political criteria) regions as well as for Japan and Sierra Leone, which are the countries with the highest and lowest life expectancy in 2013 respectively.

There has been a significant increase in life expectancy in most regions, although the rates of increase vary considerably between the different categories of countries as well as over different time periods. In particular, there was significant progress in the 1960s and 1970s in all countries. The rates of increase were higher in countries and regions where they were already extremely low. For example, as seen in Figure 4.12, life expectancy in sub-Saharan African countries went up from 40.2 years in 1960 to 56.9 in 2013. In addition, according to data from the World Bank (2015), life expectancy in the world region of Middle East and North Africa went up from 46.6 in 1960 to 72.4 in 2013. In the same period the increase for countries in East Asia and the Pacific went up from 48 to 74.9 years. There were smaller increases in higher income countries where life expectancy was already relatively high, such as Western Europe and North America. For instance, life expectancy in North America went up from 69.9 to 79.1 years and in countries that now make up the European Union it went up

from 69.3 to 80.4 years. Worldwide the increase was 18.5 years between 1960 and 2013. However, life expectancy remains stubbornly low in the “least developed” countries and especially in sub-Saharan African countries, where HIV/AIDS has been a major cause of death. In particular, in several of these countries there was no change in life expectancy or a decline (also see discussion in the next section). Other causes of significant declines in life expectancy include major environmental disasters such as the recent earthquake in Nepal but also armed conflict, such as the 1990s genocide in Rwanda, or the more recent wars in Syria, Afghanistan, Iraq, and Sudan.

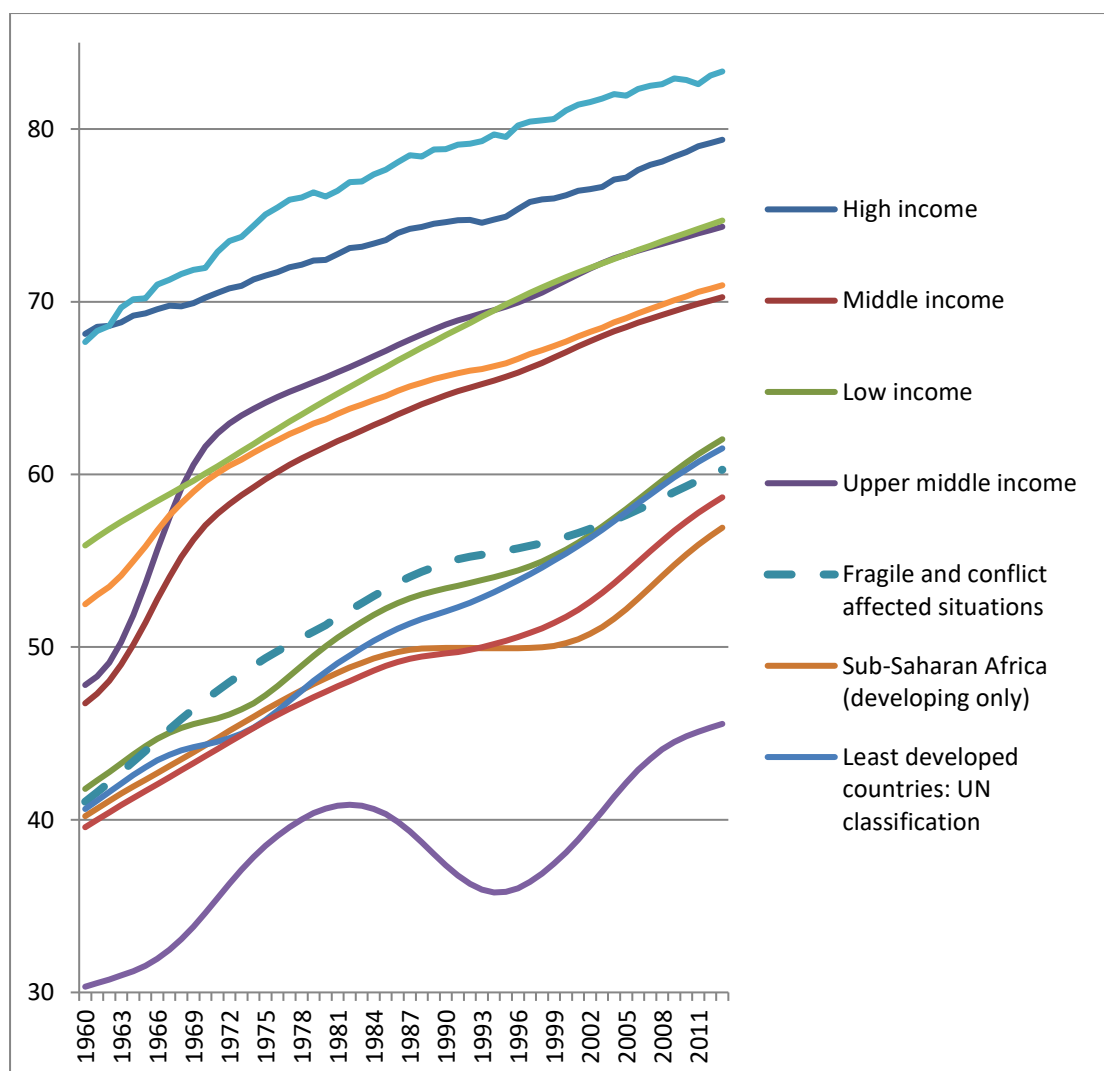


Figure 4.12: Life expectancy trends 1960-2013 (Source: The World Bank, 2015)

There is also a high but rapidly falling infant mortality rate in least developed regions. Whereas the IMR for the period 2005–10 was just over 4 per 1,000 live births in North America, most of Europe and Australia/New Zealand, it averages 22 in Latin America, 56 in south-central Asia and 80 in sub-Saharan Africa. It was one of the United Nation's Millennium Development Goals to reduce by two-thirds the mortality rate among children under five (www.undp.org). See Case Study 4.1

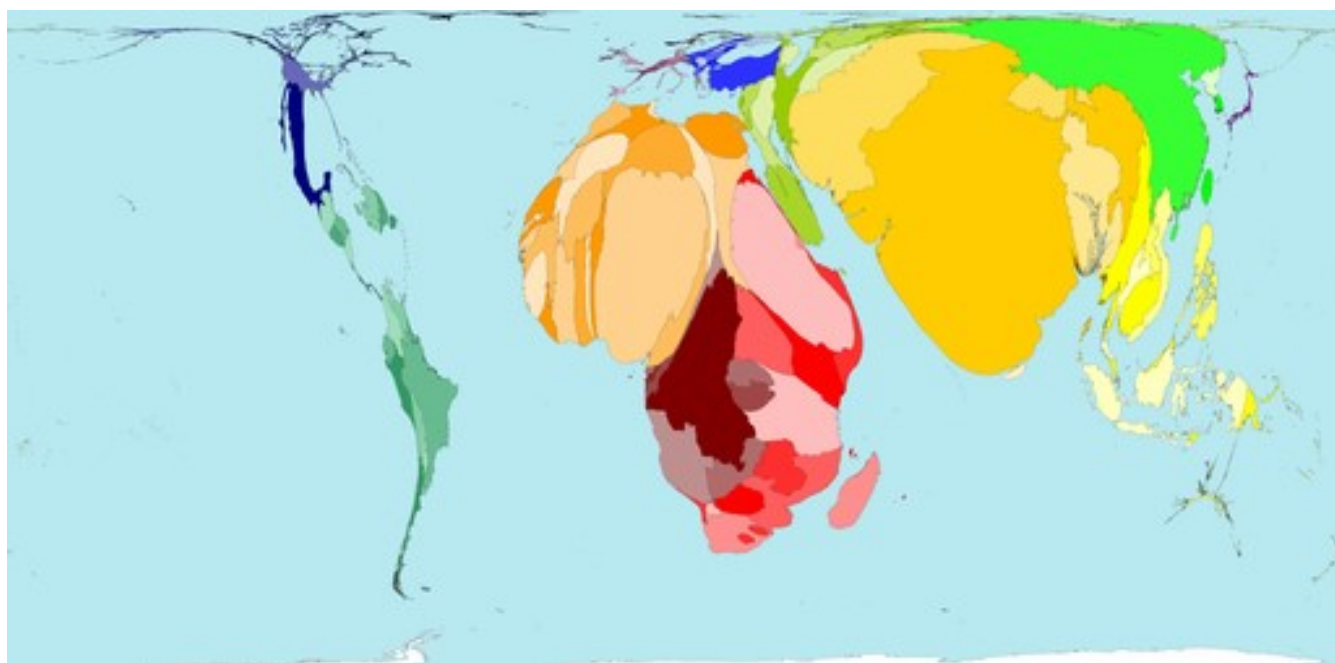


Figure 4.13: Infant mortality (Territory size shows the proportion of infant deaths worldwide that occurred there in 2002. Infant deaths are deaths of babies during their first year of life)

Thematic case study 4.1

United Nation's Millennium Development Goal number 4: reduce by two-thirds the mortality rate among children under 5.

As discussed in Chapter 8, the Millennium Development Goals are eight development objectives that were set to be achieved by the end of 2015. They were adopted by 189 nations at the UN Millennium Summit in September 2000 (see www.undp.org/mdg for a full overview of the goals). Goal number 4 aimed to reduce by two-thirds the mortality rate among children under 5.

Progress was to be measured by the following indicators: under-5 mortality rate; infant mortality rate and the proportion of 1-year-old children immunized against measles. UN data shows, however, that in the first four years of the scheme little progress had been made in sub-Saharan Africa. Few countries there saw infant mortality decrease significantly and some had even seen rates increase. Some countries had experienced a rise in immunization rates but this is not universal to the region (for an excellent database on Millennium Development Goal data go to <http://unstats.un.org/unsd/mdg>). Elsewhere though there had been great progress, but these achievements was averaged down by the deaths of so many very small children in the very worse-off places.

Overall, according to the latest Millennium Development Goals Reports by the UN (2014) and another report by UNICEF (2014), although there has been considerable progress, the world was still falling short of the MDG child mortality target by 2014. In particular, it is noted that there has been major progress in improving child survival with the under-five mortality rate declining by almost half since 1990 (but not yet to two thirds of that rate). In addition, the rate at which under-five mortality is declining has more than tripled during the same period, with Eastern and Southern Africa having the highest annual rate of reduction in the world once East Asia and the Pacific are excluded from the comparisons. It is also noted that under-five mortality is falling among the poorest children. However, the progress has been insufficient to meet goal number 4 by the end of 2015 and if current trends continue the target will only be reached by 2026, 11 years behind schedule. Further, without rapid increases in funding to

prevent easily preventable child deaths, the UN estimates that in some parts of sub-Saharan Africa the goals will not be reached until 2115. Despite the progress the toll of under-five deaths over the past two decades is staggering, as 223 million children worldwide died before their fifth birthday during that period. Most of these deaths continue to occur in sub-Saharan Africa and South Asia. As pointed out in by UNICEF (2015):

“Sub-Saharan Africa continues to shoulder the greatest burden: 1 in 11 children born there still die before age 5, nearly 15 times the average in high-income countries (1 in 159). The recent momentum achieved in sub-Saharan Africa needs to be sustained and accelerated.” With regards to the causes of under-five deaths, it is noted that “although under-five deaths from leading infectious diseases have declined significantly, pneumonia, diarrhoea and malaria are still the main killers of under-fives. In 2013, pneumonia, diarrhoea and malaria caused about one third of all under-five deaths. Importantly, neonatal deaths account for 44 per cent of all under-five deaths” (UNICEF, 2015).

4.7 The demographic impact and geography of disease, natural disasters and wars

As discussed in the beginning of this chapter (see Figure 4.5) the era of global population acceleration between 1851 – 1971 was interrupted by four major events: the First World War through to the end of the influenza pandemic (1914-19), the economic crash of 1929 through to the end of depression in 1936, the Second World War (1939-1945) and the Great Chinese Famine (1958-61). These events significantly affected global life expectancy and trends in fertility, mortality and migration. Although, there have been no similar events since the Great Chinese Famine that so massively affected global population growth, there have been a number of terrible disasters and wars that had a massive impact on the life chances and demographic processes of particular world regions and countries. For example, as discussed in the previous section, most of the countries in the world that experienced a decline in life expectancy over the past few decades were in sub-Saharan Africa, where HIV/AIDS has been a major cause of death, despite the fact that the AIDS pandemic has been subsiding in recent

years. According to the World Health Organisation there were an estimated 1.5 million deaths from AIDS in the year 2013 alone. This cause of death is now declining in importance. These were 22 per cent fewer deaths in 2013 than in 2009 and 35 per cent fewer than the peak year of 2005². However, over two thirds (1.1 million) of these deaths were in Africa³. Soon more people will die each year in road crashes than from HIV/AIDS. That, of course, is not much cause for celebration. But perhaps after then we will begin to treat so many avoidable deaths from car crashes worldwide as seriously as we view pandemic?

According to UNICEF⁴ and UNAIDS (2010) there were then nine countries with HIV prevalence rates of over 10 percent and (the then) currently the worst affected country was Swaziland that has the highest rate in the world (26 per cent), followed by Botswana (23.4 per cent), whereas in terms of absolute numbers South Africa was home to the world's largest epidemic with 5.6 million people living with HIV (17.3 per cent of its total population). The figures will not be that dissimilar today, if you are reading the book shortly after its publication.

Figure 4.14 shows the trends in life expectancy in a number of selected countries that have experienced very high HIV/AIDS prevalence rates and numbers of deaths. During the 1970s and 1980s there were significant improvements of health care and life expectancy across the world (including the least developed regions) due to the successful introduction of sustained programmes curbing easily preventable diseases. For example, life expectancy in Botswana rose to approximately 65 by the mid-1980s and it was predicted that it would have reached 69 by 2011, but for HIV/AIDS. Instead, in 2011 male life expectancy was 55. In Swaziland life

² http://www.who.int/gho/hiv/epidemic_status/deaths_text/en/

³ http://www.who.int/gho/hiv/epidemic_status/hiv_007.jpg

⁴ http://www.unicef.org/esaro/5482_HIV_AIDS.html

expectancy is now 46, without HIV/AIDS it is estimated that it would be 64. As Figure 4.14 shows, there have been dramatic falls in life expectancy throughout the period when the HIV/AIDS epidemic affected each of these countries. However, there has been a gradual improvement in the more recent years for some countries that can be attributed to the use of antiretrovirals and increased education levels about the transmission of HIV and the increased use of condoms, despite the attempts of some religious groups to stop this.

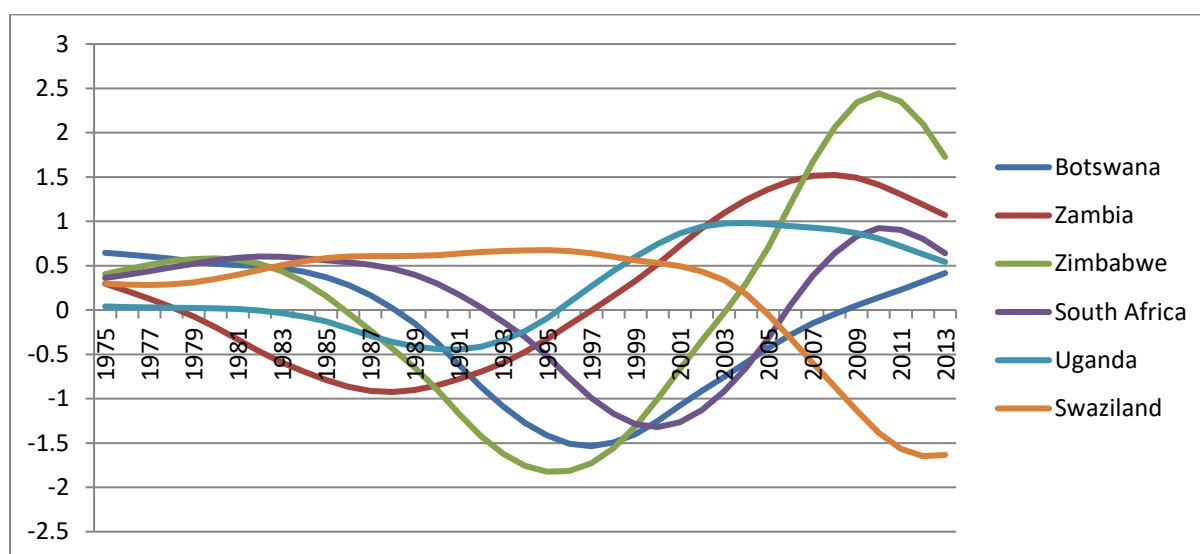


Figure 4.14: Annual change in life expectancy in five sub-Saharan countries

(Source: authors' calculations using data from The World Bank, 2015).

Thematic case study 4.2

HIV/AIDS

HIV (Human Immunodeficiency Virus) is a virus that can develop into AIDS (Acquired Immunodeficiency Syndrome). This syndrome leads to the failure of the immune system, making minor infections life threatening. There is currently no cure for this disease. The virus is most commonly passed on by sexual contact and the sharing of infected needles and can also be transmitted during pregnancy and through breastfeeding. While the scale of the pandemic is

clear, the origins of HIV/AIDS are not easily identifiable. There are many competing theories as to why and where the disease began, but it first came to the attention of the medical profession in the early 1980s when groups of patients started to suffer from diseases rarely seen within their age group and which were extremely resistant to treatment (see www.avert.org or www.unaids.org for further details). By the mid-1980s the disease was named, tests became available and public awareness campaigns on how to avoid infection began. Despite this, the number of people becoming infected grew rapidly. One of the main causes of this is the fact that HIV is asymptomatic and can be carried for many years before AIDS develops, therefore a carrier can infect many other people before they become ill themselves.

Today HIV/AIDS affects every country in the world. According to the World Health Organisation (WHO), since the beginning of the epidemic, almost 78 million people have been infected with the HIV virus and about 39 million people have died of HIV. WHO estimates that globally, 35.0 million people were living with HIV at the end of 2013. Sub-Saharan Africa is the region of the world worst affected with nearly 1 in every 20 adults living with HIV and accounting for nearly 71% of the people living with HIV worldwide.

While there is no cure there are drugs, known as antiretrovirals, that can slow down the progression of the disease. This can greatly improve the health and life expectancy of people living with HIV/AIDS and they can block the transmission of the virus from mother to child. According to a UNAIDS report antiretroviral therapy averted 5.5 million deaths in low and middle-income countries from the peak in 1995 until 2012 (UNAIDS, 2013). However, these drugs are not a cure and if treatment is missed or a patient develops resistance to the drug then the disease reverts to its normal course. Also, due to the cost of the drugs many people in low and middle-income countries have not been able to access them at all. At the beginning of the 21st century there were very few people in low and middle-income countries with access to HIV treatment. This was to some extent due to the very high prices of antiretroviral drugs and the international patents that stopped them from being manufactured at cheaper prices. However, since 2001 drug manufacturers in developing countries began to manufacture generic drugs under special terms in international trade law and this resulted in a significant

reduction in price, enabling the expansion of treatment on a global scale (AVERT, 2014).

According to UNAIDS the cost of first line antiretroviral therapy in some low and middle-income countries has been reduced to around US\$ 140 per person per year by 2013, from US\$ 10,000 per person per year which was the estimated cost in the mid-1990s.

In late 2006 UNAIDS estimated that out of over 7 million people living with HIV in these countries less than 2 million had access to antiretroviral medication. In 2012 this number was estimated to be 9.7 million and there was an overall 40-fold increase in access to antiretroviral therapy between 2002-2012 (UNAIDS, 2013). In addition, UNAIDS estimated that there was an overall 33% decrease in new HIV infections between 2001 and 2012 and a 29% decrease in AIDS related deaths between 2005 and 2012. However, in many sub-Saharan African countries less than half of expectant mothers with HIV receive the medication they require to reduce the risk of transmission to their child. While there is still the will to increase access to medication, the current prolonged global economic downturn (as we write in 2015) means that even though the cost of the drugs continues to fall many governments are struggling to purchase them in sufficient quantities or to maintain the health care infrastructure needed for their effective delivery. Overall, UNAIDS highlights that there has been remarkable progress over the last decade, but also that significant challenges remain.

World demography is still altered by several major infectious diseases. Malaria is another disease that has significantly affected life expectancy in several African countries. In 2003 there were an estimated 110 million deaths from Malaria and 92 per cent of them were recorded in Africa, with the rest mainly in Asia Pacific and Southern Asia. Deaths from Malaria when estimated globally are now found to be falling (UN, 2014⁵).

Other possible causes of significant declines in life expectancy, as well as disease, include human mobility and displacement especially following major environmental disasters

⁵ <http://www.un.org/apps/news/story.asp?NewsID=49548#.VW2qWM-qpBc>

including epidemics, droughts, famines, earthquakes, volcanoes, storms, fires and events caused by accidents or indirectly caused by wars. There is a very uneven geography of such deaths that reflects the relative vulnerability of the population. (Affifi and Jäger, 2010). With regards to the people affected by disaster and requiring external assistance (such as shelter, water, sanitation, medication and food) to survive, 43 per cent were in Southern Asia, 41 per cent in Eastern Asia and 5 per cent in Southern Africa (Worldmapper 2015a).

The ability of countries to deal with disasters and to minimise the loss of human life heavily depends on the local infrastructure that includes good communications and early warning systems and adequate planning as well as the readiness of the international community to provide support. Again, there is an uneven geography of the potential of countries and regions to address the impact of disasters leading to higher number of deaths in some areas that could have been prevented (e.g. see Worldmapper, 2015b). For instance, the 2015 earthquake in Nepal had a devastating effect upon the country's population and economy and there was an urgent and very strong need for international assistance. In contrast, Japan was in a much better position to deal with the Great Eastern Earthquake and tsunami disaster in 2011 with minimum international assistance.

It is also increasingly argued that natural disasters are now more and more likely to be the result of **climate change** and there is a great amassing of evidence in relation to the processes at play and mitigating the environmental impact that human activity has on the planet. At the same time there are increased calls for action from humanitarian agencies such as the Office of the United Nations High Commissioner for Refugees (UNHCR). Such agencies are increasingly developing climate-change scenarios that envisage massive environmental disasters which would result in direct or indirect human displacement (and **environmental**

migration, which includes **climate migration**) including hydro-meteorological disasters (flooding, hurricanes, typhoons, cyclones, mudslides etc.), environmental degradation and slow onset disaster (e.g. reduction of water availability, desertification, recurrent flooding), the possibility of 'sinking' small states and violent conflict triggered by a decrease in essential resources (such as water, land, food) owing to climate change (UNHCR, 2015⁶). UNCHR have already been involved in operations aimed at mitigating the impact of disasters for which there are strong reasons to believe that they are caused by climate change, such as the flooding of Somali refugee camps in north-eastern Kenya in November 2007 resulting in 12,000 **refugees** losing their shelters and displacing another 80,000 (UNCHR, 2015).

Related to climate change is the increase use of cars for commuting in the world and traffic – one of the causes of death expected to rise (Dorling 2011). According to the latest data from the World Health Organisation there were 1.24 million deaths from road traffic accidents in 2010.

After Road crashes the next highest source of traumatic death is war. War has a huge impact on the demographic structure, life expectancy and migration patterns of whole countries and regions. Ever since the Second World War there was no military conflict that would have such an impact on global population growth. However, since then there have been a number of smaller wars and armed conflicts across resulting in more than 50 million deaths having a devastating effect on the populations of particular countries and world regions. Figure 4.15 shows the geographical distribution of deaths resulting from wars between 1945 and 2000. China, Vietnam and the Democratic Republic of Congo and Sudan had the highest number of war deaths during this period, whereas there were very few war deaths affecting the

⁶ <http://www.unhcr.org/4901e81a4.html>

populations of Japan, Western Europe and North America. There were relatively few war deaths in Eastern Europe (including the wars in former Yugoslavia) and South America (mainly in Bolivia, Colombia and Guatemala).

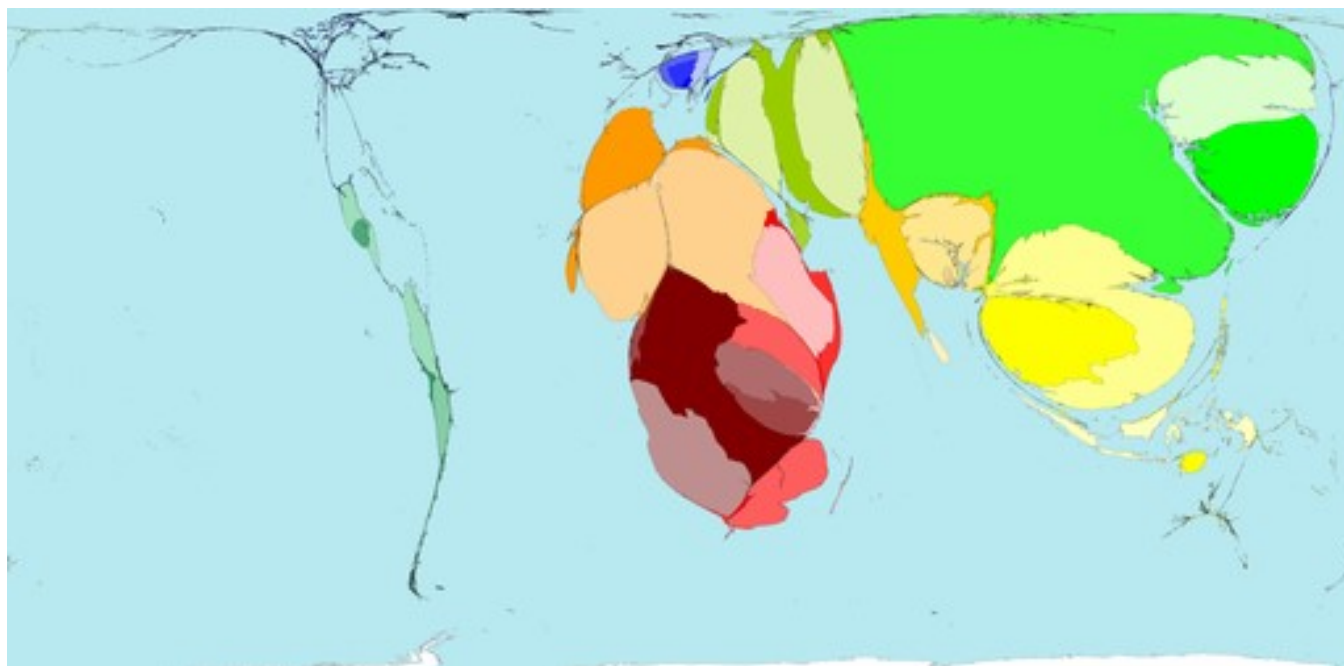


Figure 4.15: War Deaths 1945-2000



Plate 4.2 Unidentified Syrian people in refugee camp in Turkey on 18 June 2011 on the Turkish-Syrian border.

(Shutterstock)

Figure 4.16 shows the annual changes in life expectancy of five selected countries affected by war and armed conflict. War and other disasters result in population displacement and forced migration that has a demographic and socio-economic impact on the structure of regions and countries that are the destinations of immigrants (see case study 4.3).

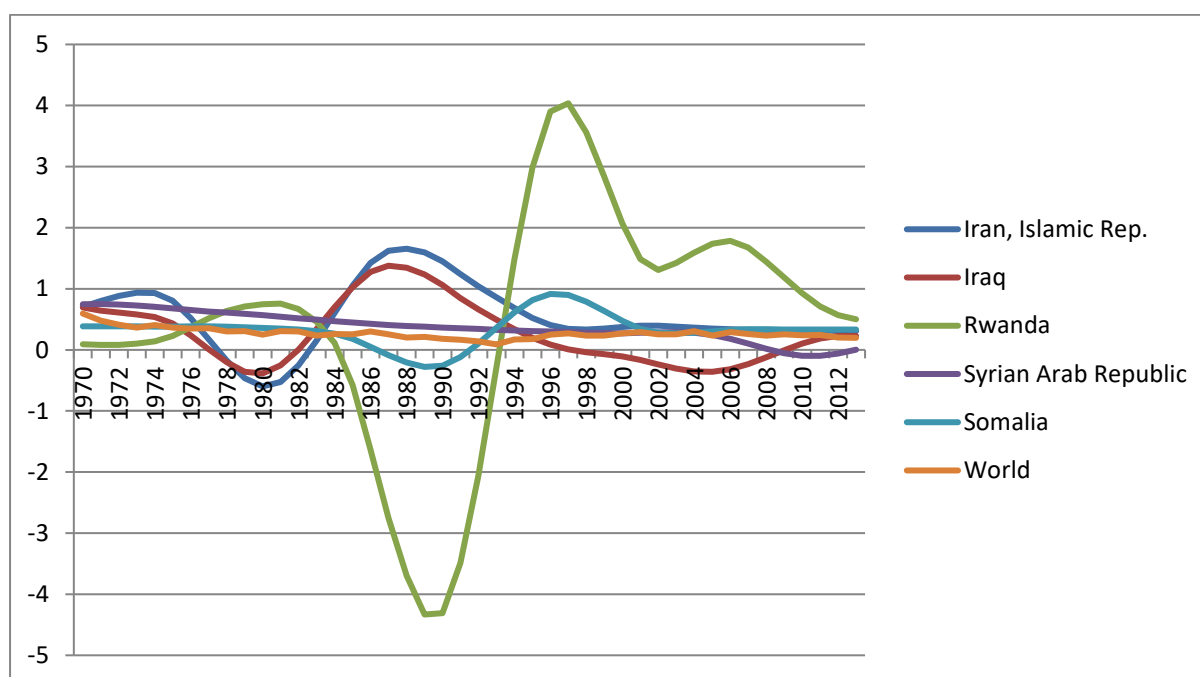


Figure 4.16: Annual change in life expectancy in five selected countries affected by war and armed conflict

Thematic case study 4.3

Forced displacement, migration and deaths in the Mediterranean Sea

The number of refugees caused by persecution, war and conflict, generalized violence, or human rights violations grew significantly over the five years 2010-2015. According to the United Nations High Commissioner for Refugees (UNCHR) report, during 2013 an average of 32,200 individuals per day were forced to leave their home and seek protection elsewhere, either within the borders of their own country or in other countries (UNCHR, 2013). This represents a significant increase to previous years (23,400 in 2012 and 14,200 in 2011). In the same year, there was a record of 1.1 million of individual applications for asylum or refugee status submitted to governments and UNCHR offices in 167 UN countries or territories. As put by António Guterres, head of the UN's refugee agency "We are witnessing a quantum leap in forced displacement in the world" (The Guardian, 2015). Overall, an estimated total of 51.2 million individuals were forced to flee their homes around the world by the end of 2013 and this is the highest recorded level since the Second World War. If all these people had their own country it would be the 24th most populous in the world. UNCHR identifies seven population categories of forcefully displaced people: refugees, asylum-seekers, internally displaced persons (IDPs), refugees who have returned home (returnees), IDPs who have return home, persons under UNCHR's stateless mandate and others who do not fall under any of these categories.

The largest source country of refugees is Afghanistan (and has been for over three decades) as a result of long-term conflicts and war. It is now closely followed by Syria, which became the second largest origin of refugees within just five years and has move from being the second largest refugee-hosting country to being to being the second largest refugee source country. The civil war that broke out there in the spring of 2011 has resulted in the uprooting of half the country's pre-war population. According to UNCHR more than four million Syrians are refugees in neighbouring countries and an additional 7.6 million internally displaced (BBC, 2015). Other countries that are in the top origins of refugees include Somalia, Sudan and the Democratic Republic of Congo (UNCHR, 2013). More details and statistical data (including data on

historical trends by region and by country) are available via the UNHCR's statistical website (www.unhcr.org/statistics).

The overwhelming majority (86 per cent) of the global refugee population is hosted by developing countries (UNCHR 2015). The country with the largest number of refugees is Pakistan (1.6 million), followed by the Iran, Lebanon, Jordan and Turkey. The graph below shows the distribution of refugees by geographic region that hosts them. A relatively small proportion (15 per cent) of refugees located in Europe. However, there is a very large (and rapidly increasing) number of people risking (and losing) their lives in order to seek refuge there. According to 'The Migrants Files' (www.detective.io/detective/the-migrants-files/), a project set up by a pan-European consortium of journalists and the European Network Against Racism 'United for Intercultural Action' (www.unitedagainstracism.org/) there have been at least 29,000 deaths of people (including hundreds of babies and children) attempting to reach Europe since 2000. A lot of these deaths occurred in the Mediterranean sea, as desperate people attempt to cross it in often rickety and unseaworthy boats, dying on an almost daily basis (The Guardian, 2014⁷). According to a recent report by the BBC (2015⁸) drawing on data by the International Organization for Migration (<http://www.iom.int/>) more than 1,700 people are believed to have died in the first four months of 2015, compared with 96 up to the end of April in 2014.

At least 800 people drowned in a single incident on 19 April 2015 after the boat they were travelling in capsized in the Libyan waters south of the Italian island of Lampedusa on 19 April 2015. According to UNCHR in the first five months of 2015 more than 42,000 people (most of them refugees) arrived by sea in Greece, six times the level of the same period in 2014 and almost the same as the total for all 2014. Over 90 per cent of these people originated from refugee-producing countries, principally Syria (over 60 per cent of arrivals in the first five months of 2015), Afghanistan, Iraq, Somalia and Eritrea (UNCHR, 2015⁹).

⁷ <http://www.theguardian.com/world/2014/oct/20/-sp-migrants-ales-asylum-sea-mediterranean>

⁸ <http://www.bbc.com/news/world-europe-32387224>

⁹ <http://www.unhcr.org/557171779.html>

The increasing numbers of people trying to seek refuge in Europe and the recent deaths of thousands of migrants trying to cross the Mediterranean prompted the European Union to prepare an emergency response to stave off a worsening of the humanitarian crisis. This includes proposals for all member states to host a set number of migrants, partly to relieve the pressure on southern states like Italy and Greece. However, they also include controversial proposals (that were heavily criticised by human rights activists and organisations such as Amnesty International) for military action to identify, capture and destroy boats that carry migrants before they embark to Europe¹⁰. So far, as we write in 2015, protestors have managed to prevent military powers of rich nations from carrying out such inhuman acts. It should also be noted that there are also now strong anti-immigration sentiment and views in some regions and countries of Europe that oppose the welcoming and integration of immigrants and refugees. These are similar to the anti-refugee sentiments in the 1930s and early 1940s that resulted in Jewish people being barred entry into countries such as the UK. At the same time, there are emerging movements and activist networks calling for open welcoming spaces, such as the 'all together' initiative in the Greek island of Lesbos (<http://lesvos.w2eu.net/>). Similarly, over 70 years ago activists managed to help Jewish children escape mainland Europe on the kinder-transports – if not their parents. Given knowledge of refugees situations in our recent past it is surprising that such initiatives are not more warmly embraced and supported by the European Union and by local and national governments, given the potential benefits (see section 4.5) and the expedient challenges of aging populations in Europe (also see section 4.9).

¹⁰ <http://www.theguardian.com/world/2015/may/13/migrant-crisis-eu-plan-to-strike-libya-networks-could-include-ground-forces>

4.8 The challenges of ageing populations

According to UN calculations (Population Reference Bureau, 2014) in 1970 just under one-half (48 per cent) of the global population was younger than 20. Another 47 per cent was aged 20-64 and the remaining 5 percent was aged 65 and older. The age structure of the world's population has now significantly changed as a result of lower fertility rates and longer life expectancy. The population under age 20 is now approximately just 35 per cent and is falling most rapidly, whereas the population aged 20-64 is 58 per cent, falling in numbers more slowly and the population aged 65 and over is 7 per cent and rising as a share of the total. However, there is considerable variation across world regions and countries.

Europe and North America have populations that are much older than the global average. It can be argued that this is the result of them entering the final stage of the transition model discussed in section 4.2. Whereas, in contrast, Africa's current youthful age structure is similar to the global average in 1970 (United Nations, 2013). These differences in population structures between are illustrated in the diagrams shown in Figure 4.17. These diagrams, known as population pyramids, show the distribution of the men and women in the world and different world regions by age groups in 1970 and 2014. It is worth noting the difference in the shape between Europe and North America and the other continents (and especially Africa). The shape of these diagrams for Europe and North America (and especially by 2014) is often described as a 'constrictive pyramid' typical for affluent societies with low fertility and mortality rates and relatively older populations. As can be seen in the first pyramid shown in Figure 4.17 there is a trend for the World population pyramid to become 'constrictive'. In addition, the 2014 pyramids for Europe and North America clearly stand out from the rest



Figure 4.17: Age Structure 1970 – 2014. Source: United Nations Population Division, World Population Prospects: The 2012 Revision (New York: United Nations, 2013)

Soon most countries in Europe and North America are going to be faced with a demographic and pension crisis as there will be fewer people of working age and fewer taxpayers, making it impossible to provide current levels of support, especially in areas of net out young migration and fertility below 1.5 children per potential couple. A possible solution to these issues could include increasing the retirement age (and this has already happened in some countries, including the UK), as this would result in additional working years and tax revenues and a reduction in the time that a person might receive a state pension. Another possible solution often discussed is for governments to try and stimulate birth rates so that

more young people enter the economy in the future. A few governments are therefore resorting to incentive schemes to try and arrest the declining birth rates experienced by many European countries. For example, the German government introduced in January 2007 a 'parents' money' law, which means that parents who remain at home to look after their child will receive 67 per cent of their previous income for a year (up to €1800 per month). Those on a low income will receive 12 monthly payments of €450. This is extremely generous when compared to the British system wherein a new mother receives 90 per cent of her previous pay for 6 weeks and then a flat €150 for 26 weeks only. Men can take 2 weeks paid paternity leave at €150 per week for 2 weeks. In Norway mothers receive 10 months at full pay and men *have* to take 4 weeks paternity leave at full pay, helping the country to the third highest birth rate in Europe. Poland and Italy have recently introduced an incentive of a one-off payment for each child born. Of course, all these 'pro-natality' schemes mainly aimed at white populations are clearly driven by racist desires. There is absolutely no need to encourage so many white mothers within European and North America to have more children unless you really dislike children with darker skins and would prefer to see darker skinned children and their prospective parents drown in the Mediterranean and die from lack of water on the desert by the Mexican US border.

The more obvious solution of encouraging international migration into countries with ageing populations is also a way of increasing their workforce and slowing down population growth in poorer countries. In addition, increased migration into countries like the UK would help reduce current debts, and also help in caring for a growing elderly population. It would also reduce global population growth faster than even the current very fast rate of growth slowdown. That is because young migrants from poorer countries who move to countries like the UK tend to have fewer children than they would have had had they not migrated.

Although many other factors will influence the future level of public sector debt in the UK, increased immigration reduces debt, while emigration of younger adults from Britain will increase it.

4.11 Conclusion

Throughout human history the global population experienced relatively slow growth, with the exceptions of the Neolithic Revolution and the most recent era of global population acceleration from 1851 to 1971, leading to a population explosion from 1 billion in 1820 to seven billion in 2011. The most significant increase occurred in the past 60 years, when the population went up by four billion, from 3 billion in 1950 to seven billion in 2011. However, it is vital to realize that for the majority of those last 60 years population growth rates have been rapidly decelerating everywhere. During this period the population of the more affluent world (described by the UN as ‘developed regions’) increased from 800 million in 1950 to only 1.2 billion in 2011 (and it is now only stabilized by in-migration), whereas the population of the poorest (‘least developed’) regions more than trebled, going up from 1.7 billion to 5.8 billion. That global division is due to deceleration in the growth rate having been earliest and fastest in the richest of places and, at the other end of a continuum, latest and slowest in just a few parts of Africa.

The overall planetary population increase has been placing a strain on environmental, food, housing and welfare infrastructures. However, it should be noted that it is not just the number of people that has an impact on these infrastructures, but how people live. For instance, the so called ‘developed countries’ have been polluting the environment and contributing to global warming and climate change far more compared to the most populous poorer parts of the

world (see Chapter 6). The strain is not from those who are greatest in number for from those whose greed is most great, in both rich and poor countries alike. Greed control is now so much more important than population control.

This chapter has highlighted as especially important the fact that since 1971 the world has entered an era of global deceleration of population growth rates. There is projected to be an even more significant slowdown in population growth very soon which is expected to lead to a world human population peak of, at most, ten billion being reached by around 2100. Average fertility rates worldwide are rapidly falling and are predicted to continue to fall and converge to just below the population replacement level rate of 2.1 by 2100 in all world regions. Estimates do of course vary greatly although few people talk as seriously as they should about the future low fertility scenarios in which fewer than 9 billion people might be the peak. In contrast in 2015 talk of 11 billion humans by 2100 was more common. The uncertainty is important to acknowledge. We humans think we know so much but we don't even know how many grandchildren we are most likely to actually have, even in aggregate.

As fertility's contribution to population growth is declining, migration is playing a more and more important role in the growth and social and economic development of countries and regions and there have been increasing numbers of international migrants crossing borders in recent years. At the same time, there has been a dramatic increase in average life expectancy across the world over the past 200 years. In 1800 all countries around the world had an average life expectancy at birth of less than 45 years (according to the Gapminder; see useful web-sites section); by 2013 the estimated global average life expectancy was 71 years.

Averages only tell us so much. There are still significant social and spatial inequalities in life expectancy and life chances worldwide. In the so called ‘least developed countries’ the average life expectancy at birth was 61.5 years in 2013, whereas in sub-Saharan African countries it was 56.9 years. In contrast, in the affluent world (in the so called ‘high income countries’ as classified by the World Bank) average life expectancy was 79.4 years and in particular parts of the regions of this richest section of the world it was even higher (e.g. 83.3 in Japan and 80.4 years when the European Union is averaged out). In contrast to such longevity poorer countries are far more effected by disease, natural disasters (including disasters caused by climate change) and wars that have been disproportionately affecting all the poorest regions of the world, leading to the slow-down in gain, or even a short decline in life expectancy, as well as to human displacement. Mostly recently countries such as Afghanistan and Syria have reported significant numbers of premature deaths due to conflict and huge numbers of people having to become refugees. The overwhelming majority of the world’s refugees are hosted by developing countries and only a relatively small number are hosted by affluent countries. For example, only 15% of global refugees are hosted in Europe and 7% in the Americas.

Recently some groups within some of the more affluent countries have been facing decreases in life expectancy due to rising income and wealth inequalities as well as the introduction of severe and sometimes punitive austerity measures (O’Hara, 2014). Further, there have been a growing number of studies suggesting a very strong link between a number of factors relating to life expectancy, well-being and health of populations and income and wealth inequality, especially in more affluent societies. In particular, according to the ground breaking book “The Spirit Level: Why Equality is Better for Everyone” by epidemiologists Richard

Wilkinson and Kate Pickett (2010) a wide number of indicators (including demographic indicators such as life expectancy) are related to inequalities in income and wealth.

Regions of the affluent world (in short especially Europe, North America and Japan) are facing the challenges of ageing populations and a potential demographic and pension crisis on top of all the trends already listed here. As we argued in this chapter, an obvious way to respond to this potential crisis is to encourage international migration, including a warmer welcome and integration of refugees. Net international migration tends to be into countries with ageing populations and is also a way of increasing their workforce and slowing down population growth in poorer countries. Migrants tend to have fewer children than people in the areas they leave, and to behave more like the population they join in terms of their fertility.

Overall, it is very important to understand demographic trends and processes as well as the interdependencies between countries, regions and cities and all their populations, but to also highlight the fact that the actual number of people on the planet is, to an important extent, incidental to the impact humans have on both the environment and each other. This is also illustrated in all other chapters of this book. It is not how many of us there are or will be that matters most, but how we all behave, think and act in future. Control greed and we can expect a healthy demographic future.

Learning outcomes

Having read this chapter, you should be able to:

- Recognize the dynamic nature of populations, not only in terms of size but also with respect to the geographies which exist within the overall growth.
- Explore how sudden economic changes, disasters or disease affects life expectancy and alters the course taken by countries through the demographic transition process.
- Acknowledge the increasing importance of migration as a component of national population change alongside fertility and mortality.
- Assess the significant problems that ageing populations will have in terms of social and economic development, as well as issues of selfishness, empathy and greed.
- Understand the potential impact of inequality upon demographic issues and life expectancy.

Further reading

Bailey, A.J. (2011) Population geographies and climate change, *Progress in Human Geography*, 35(5), 686–95.

Bailey, A.J. (2010) Population geographies, gender, and the mitigation-development nexus, *Progress in Human Geography*, (3), 375–86. The first of these articles connects the themes of this chapter with those of Chapters 5 and 6, the second with those of Chapters 7 and 8.

Castles, S. and Miller, M.J. (2009) *The Age of Migration: International Population Movements in the Modern World*, Palgrave Macmillan, Basingstoke. This book, now in its fourth edition, provides a comprehensive survey of past trends and current developments in international migration. See the companion website at: www.age-of-migration.com/UK/index.asp

Dorling, D. (2011), *Roads, Casualties and Public Health: the Open Sewers of the 21st Century*

FACTS' 21st Westminster Lecture, ISSN 1740-0368, London: Parliamentary Advisory Council for

Transport Safety: http://www.dannydorling.org/?page_id=1916

Dorling, D. (2013), *Population Ten Billion*, Constable, London

Harper, S. (2005) *Ageing Societies*, Hodder Arnold, London. This book explores the issues of population in both developing and mature countries. It examines the necessity for people to extend their working lives, the changes ageing societies have on families, the challenges it poses for state social provision and the impact these issues will have on developing regions.

Hennig, D. B. (2013), *Rediscovering the world: map transformations of human and physical space*, Heidelberg: Springer.

Hughes, B. (2010), '*Too Many Of Whom and Too Much Of What? What the new population hysteria tells us about the global economic and environmental crisis, and its causes*', A No One Is Illegal discussion paper, <http://www.noii.org.uk/2010/01/13/too-many-of-whomand-too-much-of-what/>

Hugo, G. (2007) Population geography. *Progress in Human Geography*, **31**(1), 77–88. One of a series of articles looking at developments in population geography in the Southern Hemisphere. This article looks at population vulnerability and migration.

Jones, H. (1990) *Population Geography*, Paul Chapman, London. This is a clear introduction to geographical perspectives on population. Look especially at the chapters on population growth and regulation, international variations in mortality, fertility in developed countries, fertility in less developed countries, and international migration.

National Research Council (2000) *Beyond Six Billion: Forecasting the World's Population*, National Academy Press, Washington, DC. This presents the findings of a US National Academy of Sciences panel on population projections. It contains detailed examinations of transitional and post-transitional fertility, mortality and life expectancy, and international migration, together with assessments of the accuracy of past projections and of the uncertainties in current population forecasts.

UNAIDS (2010) *UNAIDS 2011–2015 Strategy: Getting to Zero*. Available to download at www.unaids.org/en/media/unaids/contentassets/documents/unaidspublication/2010/JC2034_UNAIDS_Strategy_en.pdf. This report gives a comprehensive overview of the challenges that countries and international organizations face when confronting the epidemic. It also details many success stories and the development of good practice as well as providing country and regional statistics.

United Nations (2010) *World Population to 2300*. Available to download at www.un.org/esa/population/publications/.../WorldPop2300final.pdf. The report provides an overview of global demographic trends and explores in detail population size and growth, urbanization and city growth, population ageing, fertility and contraception, mortality and international migration.

Vlassopoulos, C. (2013), Defining environmental migration in the climate change era. Problem, consequence or solution?, in T. Faist & J. Shade, *Disentangling Migration and Climate Change : Toward an analysis of Concepts, Methodologies, and Policies*, Springer

Useful websites

www.worldpopulationatlas.org. A collection of world maps, where territories are re-sized on each map according to the subject of interest.

www.gapminder.org. An online interactive visualization of data resource promoting sustainable global development and achievement of the United Nations Millennium Development Goals.

www.iom.int. Provides access to the International Organization for Migration publications and statistics.

www.un.org/esa/population/unpop.htm Provides access to extracts from the United Nations' population-related publications and statistics.

www.census.gov/ipc/www/idb US Census Bureau (online) International Data Base, United States Bureau of the Census, Washington, DC. This is a computerized source of demographic

www.neighbourhood.statistics.gov.uk/dissemination. The Neighbourhood Statistics website provides access to a wealth of UK Official Statistics, including data from the 2001 and 2011 Censuses.

www.unhcr.org Provides access to publications and data of the United Nations Refugee Agency

data.worldbank.org Free and open access to data about development in countries around the world (including a wealth of demographic data)

<http://www.ggd.net/maddison/maddison-project/home.htm> The Maddison Project providing information (including population data sets) in relation to the work of Angus Maddison, who was a world scholar on quantitative macro-economic history