Quadrant II – Transcript and Related Materials

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Unit: Fundamental of Population Geography (DSC)

Module Name: Growth of Population in the World (Decadal and Annual)

Module No: 10

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Population in the world is currently (2020) growing at a rate of around 1.05% per year (down from 1.08% in 2019, 1.10% in 2018, and 1.12% in 2017). The current average population increase is estimated at 81 million people per year.

Population cartogram: a geographical presentation of the world where the size of the countries is not drawn according to the distribution of land, but according to the distribution of people. The cartogram shows where in the world the global population in 2018.

The cartogram is made up of squares, each of which represents half a million people of a country's population. The 11.5 million Belgians are represented by 23 squares; the 49.5 million Colombians are represented by 99 squares; the 1.415 billion people in China are represented by 2830

squares; and the entire world population of 7.633 billion people in 2018 is represented by the total sum of 15,266 squares.

Small countries with a high population density increase in size in this cartogram relative to the world maps we are used to – look at Bangladesh, Taiwan, or the Netherlands. Large countries with a small population shrink in size (look for Canada, Mongolia, Australia, or Russia).

Source: https://ourworldindata.org/uploads/2018/09/Population-cartogram_World-1-768x294.png

Which countries are most densely populated?

Our understanding of the world is often shaped by geographical maps. But this tells us nothing about where in the world people live. To understand this, we need to look at population density.

In the map we see the number of people per square kilometre (km2) across the world.

Globally the average population density is 25 people per km2, but there are very large differences across countries.

Many of the world's small island or isolated states have large populations for their size. Macao, Monaco, Singapore, Hong Kong and Gibraltar are the five most densely populated. Singapore has nearly 8,000 people per

km2 – more than 200 times as dense as the US, and 2000 times that of Australia.

Of the larger countries, Bangladesh is the most densely-populated with 1,252 people per square kilometer; this is almost three times as dense as its neighbour, India. It's followed by Lebanon (595), South Korea (528), the Netherlands (508) and Rwanda (495 per km2) completing the top five.

Greenland is the least dense, with less than 0.2 people per square km2, followed by Mongolia, Namibia, Australia and Iceland. In our population cartogram these are the countries that take up much less space than on a standard geographical map.

How has world population growth changed over time?

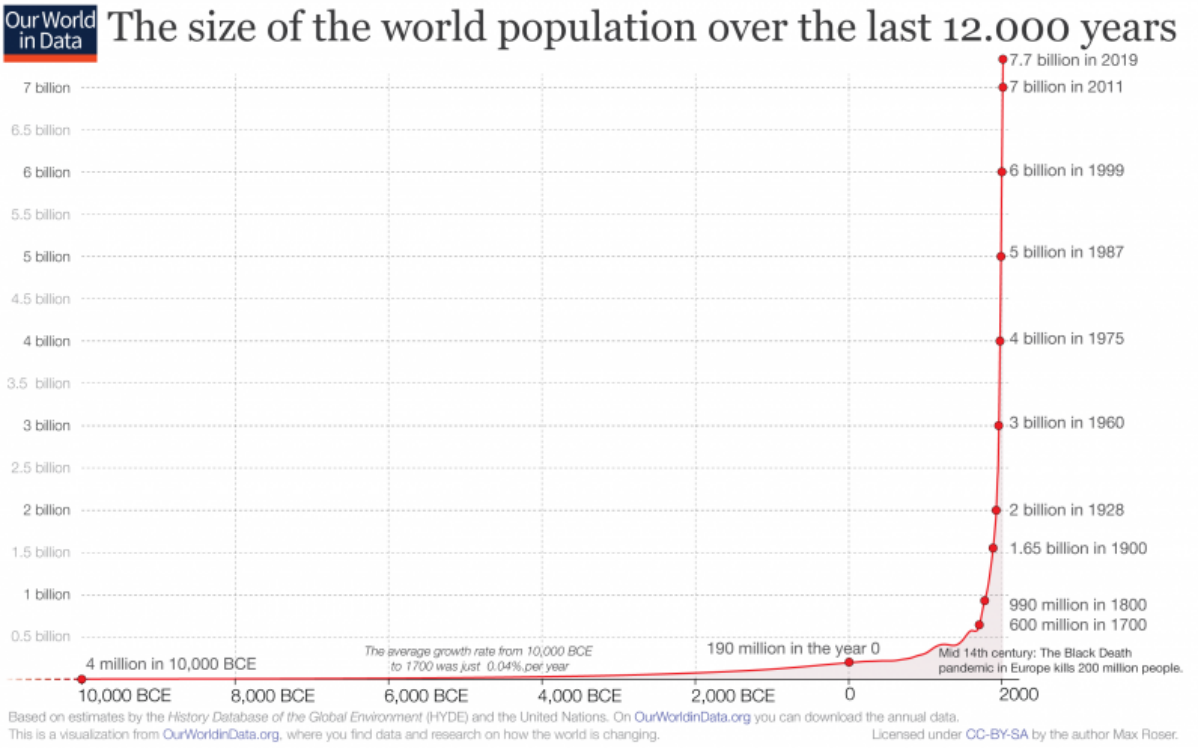
World population from 10,000 BC to today

The increasing number of people living on our planet over the last 12,000 years. A mind-boggling change: The world population today that is 1,860-times the size of what it was 12 millennia ago when the world population was around 4 million – half of the current population of London.

Historical demographers estimate that around the year 1800 the world population was only around 1 billion people. This implies that on average the population grew very slowly over this long time from 10,000 BCE to 1700 (by 0.04% annually). After 1800 this changed fundamentally: The world population was around 1 billion in the year 1800 and increased 7-fold since then.

Around 108 billion people have ever lived on our planet. This means that today's population size makes up 6.5% of the total number of people ever born.

For the long period from the appearance of modern Homo sapiens up to the starting point of this chart in 10,000 BCE it is estimated that the total world population was often well under one million. In this period our species was often seriously threatened by extinction.



Source: https://ourworldindata.org/uploads/2018/11/Annual-World-Population-since-10-thousand-BCE-for-OWID-800x498.png

How has the world population growth rate changed?

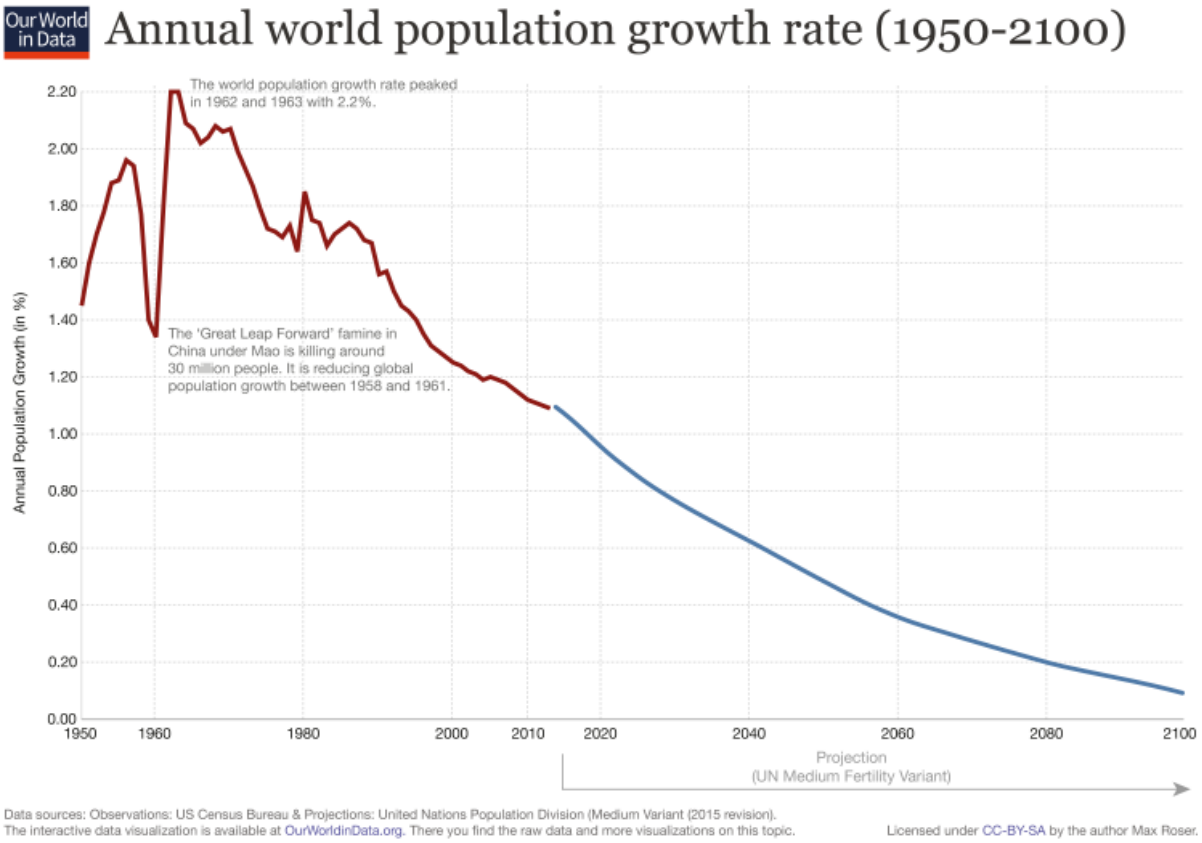
In terms of recent developments, the data from the UN Population Division provides consistent and comparable estimates (and projections) within and across countries and time, over the last century. This data starts from estimates for 1950, and is updated periodically to reflect changes in fertility, mortality and international migration.

The global population growth rate peaked long ago. The chart shows that global population growth reached a peak in 1962 and 1963 with an annual growth rate of 2.2%; but since then, world population growth has halved.

For the last half-century, a world in which the population growth rate has been declining. The UN projects that this decline will continue in the coming decades.

For population growth to be exponential, the growth rate would have be the same over time (e.g. 2% growth every year). In absolute terms, this would result in an exponential increase in the number of people. That's because we'd be multiplying an ever-larger number of people by the same 2%. 2% of the population this year would be larger than 2% last year, and so on; this means the population would grow exponentially.

Since the 1960s the growth rate has been falling. This means the world population is not growing exponentially – for decades now, growth has been more similar to a linear trend.



Source: https://ourworldindata.org/uploads/2018/11/Annual-World-Population-since-10-thousand-BCE-for-OWID-800x498.png

The absolute annual change of the population

The previous section looked at the growth rate. This visualization here shows the annual global population increase from 1950 to today and the projection until the end of this century.

The absolute increase of the population per year has peaked in the late 1980s at over 90 million additional people each year. But it stayed high until recently. From now on the UN expects the annual increase to decline by around 1 million every year.

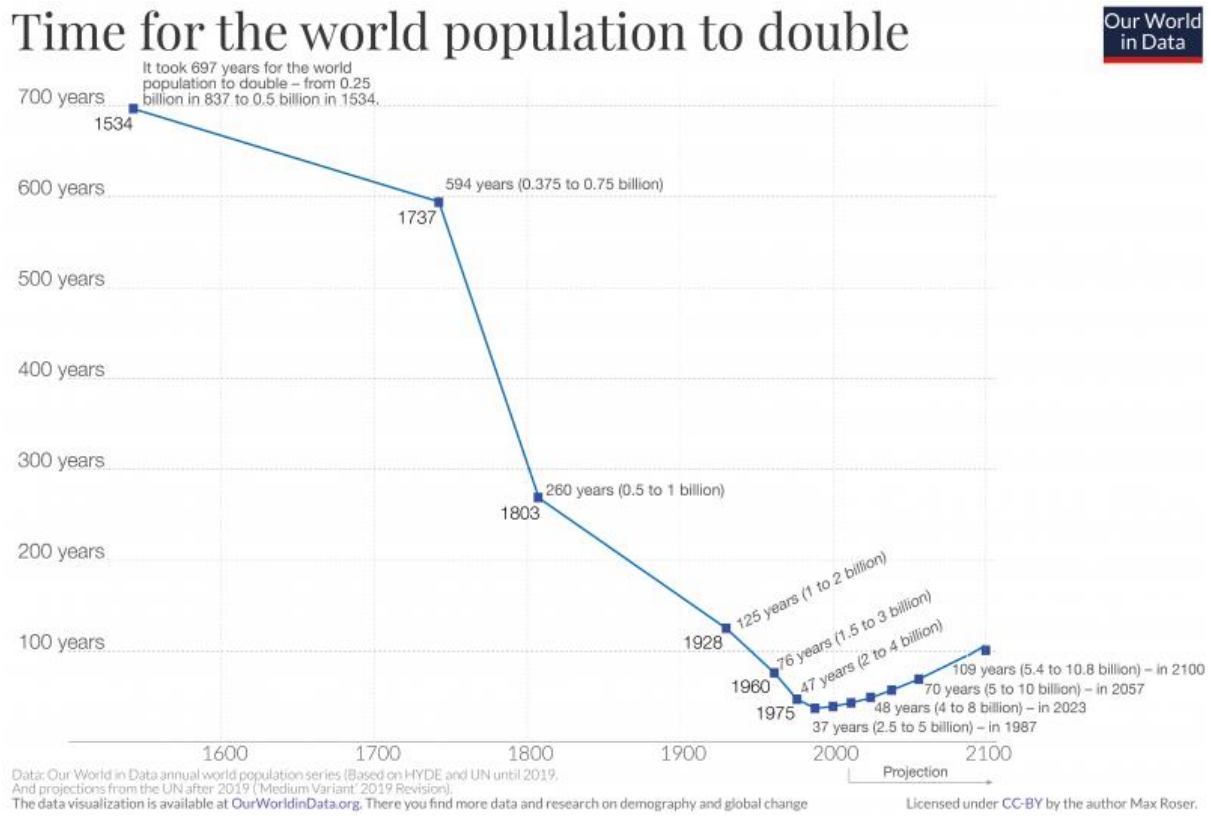
Population Growth Over the Long Run

The visualization shows how strongly the growth rate of the world population changed over time. In the past the population grew slowly: it

took nearly seven centuries for the population to double from 0.25 billion (in the early 9th century) to 0.5 billion in the middle of the 16th century. As the growth rate slowly climbed, the population doubling time fell but remained in the order of centuries into the first half of the 20th century. Things sped up considerably in the middle of the 20th century.

The fastest doubling of the world population happened between 1950 and 1987: a doubling from 2.5 to 5 billion people in just 37 years — the population doubled within a little more than one generation. This period was marked by a peak population growth of 2.1% in 1962.

Since then, population growth has been slowing, and along with it the doubling time. In this visualisation we have used the UN projections to show how the doubling time is projected to change until the end of this century. By 2100, it will once again have taken approximately 100 years for the population to double to a predicted 10.8 billion.

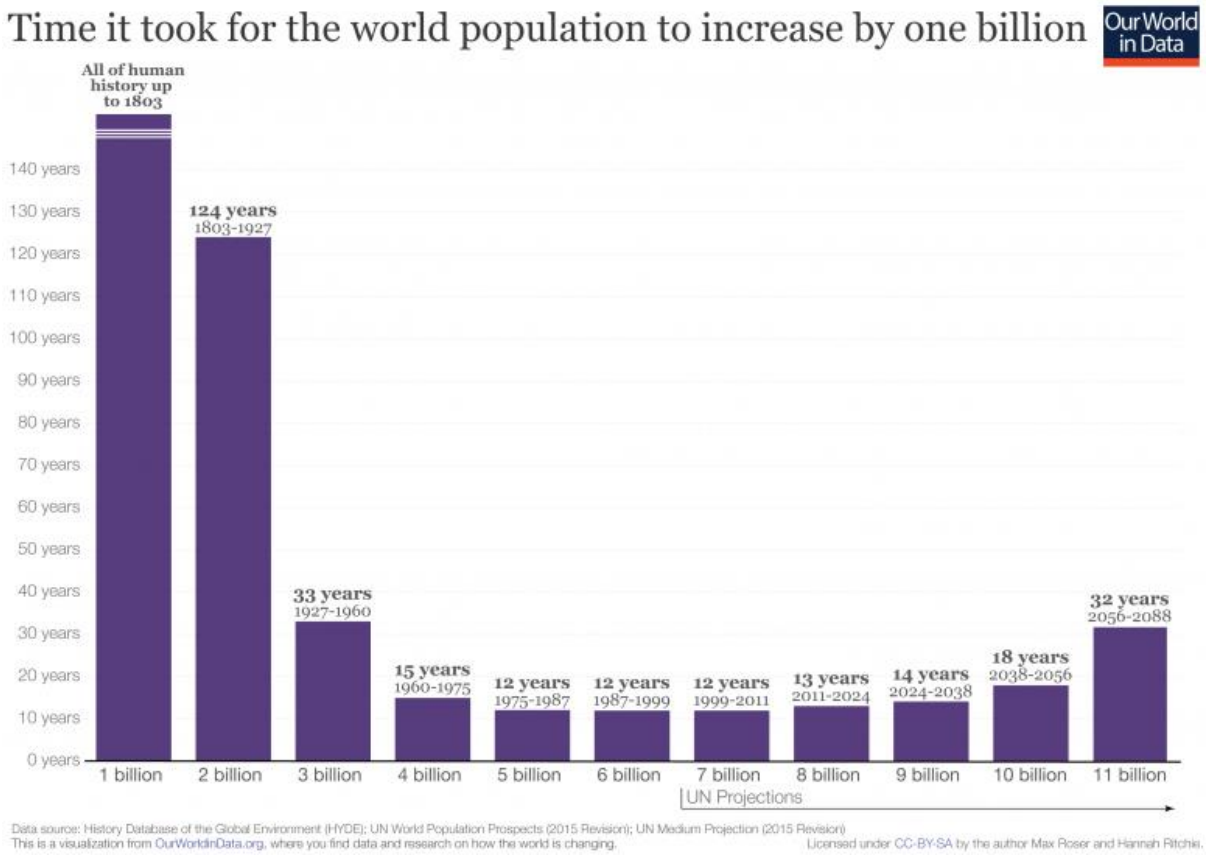


Source: https://ourworldindata.org/uploads/2019/12/World-population-doubling-time-1-1536x1038.png

How long did it take for the world population to increase by one billion?

The population growth rate has changed dramatically through time. It wasn't until 1803 that the world reached its first billion; it then took another 124 years to reach two billion. By the third billion, this period had reduced to 33 years, reduced further to 15 years to reach four. The period of fastest growth occurred through 1975 to 2011, taking only 12 years to increase by one billion for the 5th, 6th and 7th.

The world has now surpassed this peak rate of growth, and the period between each billion is expected to continue to rise. It's estimated to take approximately 13 years to reach eight billion in 2024; a further 14 years to reach 9 billion in 2038; 18 years to reach 10 billion in 2056; and a further 32 years to reach the 11th billion in 2088.



Source: https://ourworldindata.org/world-population-growth#how-is-the-global-population-distributed-across-the-world

Population Growth by World Region

Two hundred years ago the world population was just over one billion. Since then, the number of people on the planet grew more than 7-fold to 7.7 billion in 2019. How is the world population distributed across regions and how did it change over this period of rapid global growth?

In this visualization we see historical population estimates by region from 1820 through to today. These estimates are published by the History Database of the Global Environment (HYDE) and the United Nations Population Division from 1950 onwards.

Most people always lived in Asia: Today it is 60% two hundred years ago it was 68%. If you want to see the relative distribution across the world regions in more detail you can switch to the relative view.

The world region that saw the fastest population growth over last two centuries was North America. The population grew 31-fold. Latin America saw the second largest increase (28-fold). Over the same period the population Europe of increased 3-fold, in Africa 14-fold, and in Asia 6-fold.

Population growth by country

Over the last century, the world has seen rapid population growth.

The top five most populous countries are:

(1) China (1.43 billion)

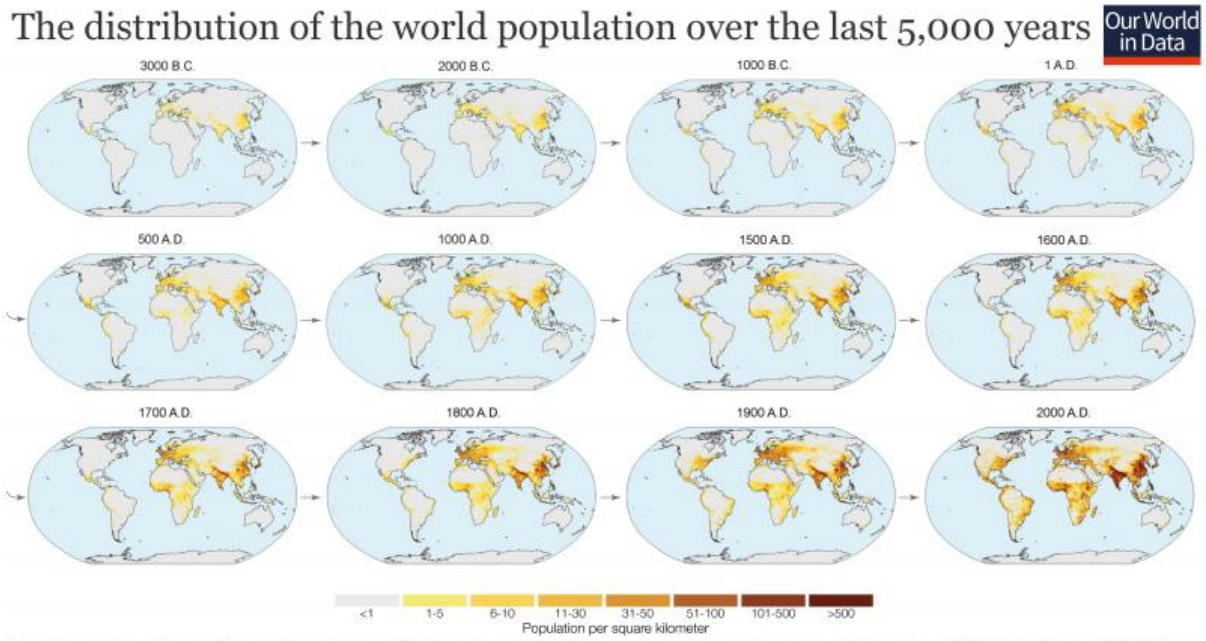
(2) India (1.37 billion)

(3) United States (329 million)

(4) Indonesia (270 million)

(5) Brazil (211 million)

For several centuries, China has been the world’s most populous country. But not for long: it’s expected that India will overtake China within the next decade.



Source: https://ourworldindata.org/uploads/2019/12/Global-population-distribution-over-5000-years-1536x866.png

Population growth rate by country and region

Global population growth peaked in the early 1960s.

There are two metrics use to look at population growth rates:

(1) ‘Natural population growth’: this is the change in population as determined by births and deaths only. Migration flows are not counted.

(2) Population growth rate: this is the change in population as determined by births, deaths plus migration flows.

Both of these measures of population growth across the world are shown in the two charts.

There are some countries today where the natural population growth (not including migration) is slightly negative: the number of deaths exceed the number of births. Up until the 1970s, there were no countries with a negative natural population growth.

Overall, growth rates in most countries have been going down since the 1960s. Yet substantial differences exist across countries and regions.

Whilst Western Europe's growth rates are currently close to zero, sub-Saharan Africa's rates remain higher than 3% — that is, still higher than the peak growth rates recorded for the world at the beginning of the 1960s. Moreover, in many cases there has been divergence in growth rates. For instance, while India and Nigeria had similar growth rates in 1960 (around 2%), they took very different paths in the following years and thus currently have populations that grow at very different rates (about 0.98% for India compared to 2.53% for Nigeria).

Natural Population Growth, 2020

Natural population growth is the population increase determined by births and deaths. Migration flows are not taken into account. This is shown from 1950, with UN projections to 2099 based on its median scenario.

In 1950 there were 2.5 billion people on the planet. Now in 2019, there are 7.7 billion. By the end of the century the UN expects a global population of 11.2 billion. This visualization of the population pyramid makes it possible to understand this enormous global transformation.

Population pyramids visualize the demographic structure of a population. The width represents the size of the population of a given age; women on the right and men to the left. The bottom layer represents the number of new-borns and above it you find the numbers of older cohorts. Represented in this way the population structure of societies with high

mortality rates resembled a pyramid – this is how this famous type of visualization got its name.

In the darkest blue you see the pyramid that represents the structure of the world population in 1950. Two factors are responsible for the pyramid shape in 1950: An increasing number of births broadened the base layer of the population pyramid and a continuously high risk of death throughout life is evident by the pyramid narrowing towards the top. There were many new-born's relative to the number of people at older ages.

The narrowing of the pyramid just above the base is testimony to the fact that more than 1-in-5 children born in 1950 died before they reached the age of five.

Through shades of blue and green the same visualization shows the population structure over the last decades up to 2018.

In comparing 1950 and 2018 we see that the number of children born has increased – 97 million in 1950 to 143 million today – and that the mortality of children decreased at the same time. According to the projections there will be fewer children born at the end of this century than today. The base of the future population structure is narrower.

We are at a turning point in global population history. Between 1950 and today, it was a widening of the entire pyramid – an increase of the number of children – that was responsible for the increase of the world population. From now on is not a widening of the base, but a 'fill up' of the population above the base: the number of children will barely increase and then start to decline, but the number of people of working age and old age will increase very substantially. As global health is improving and mortality is falling, the people alive today is expected to live longer than any generation before us.

At a country level “peak child” is often followed by a time in which the country benefits from a “demographic dividend” when the proportion of the dependent young generation falls and the share of the population in working age increases.

Richer countries have benefited from this transition in the last decades and are now facing the demographic problem of an increasingly larger share of retired people that are not contributing to the labour market. In the coming decades it will be the poorer countries that can benefit from this demographic dividend.

How many people die and how many are born each year?

The world population has grows rapidly, particularly over the past century: in 1900 there were fewer than 2 billion people on the planet; today there are 7.7 billion. The change in the world population is determined by two metrics: the number of babies born, and the number of people dying.

How many are born each year?

The stacked area chart shows the number of births by world region from 1950 to 2015. In 2015, there were approximately 140 million births – 43 million more than back in 1950

Population projections show that the yearly number of births will remain at around 140 million per year over the coming decades. It is then expected to slowly decline in the second-half of the century. As the world population ages, the annual number of deaths is expected to continue to increase in the coming decades until it reaches a similar annual number as global births towards the end of the century.

As the number of births is expected to slowly fall and the number of deaths to rise the global population growth rate will continue to fall. This is when the world population will stop to increase in the future.

Why is rapid population growth a temporary phenomenon?

The Demographic Transition

Population growth is determined by births and deaths and every country has seen very substantial changes in both: In our overview on how health has changed over the long run you find the data on the dramatic decline of child mortality that has been achieved in all parts of the world. And in our coverage of fertility you find the data and research on how modern socio-economic changes – most importantly structural changes to the economy and a rise of the status and opportunities for women – contributed to a very substantial reduction of the number of children that couples have.

But declining mortality rates and declining fertility rates alone would not explain why the population increases. If they happened at the same time the growth rate of the population would not change in this transition. What is crucial here is the timing at which mortality and fertility changes.

The model that explains why rapid population growth happens is called the ‘demographic transition’. It is shown in the schematic figure. It is a beautifully simple model that describes the observed pattern in countries around the world and is one of the great insights of demography.

The demographic transition is a sequence of five stages:

Stage 1: high mortality and high birth rates. In the long time before rapid population growth the birth rate in a population is high, but since the death rate is also high, we observe no or only very small population growth. This

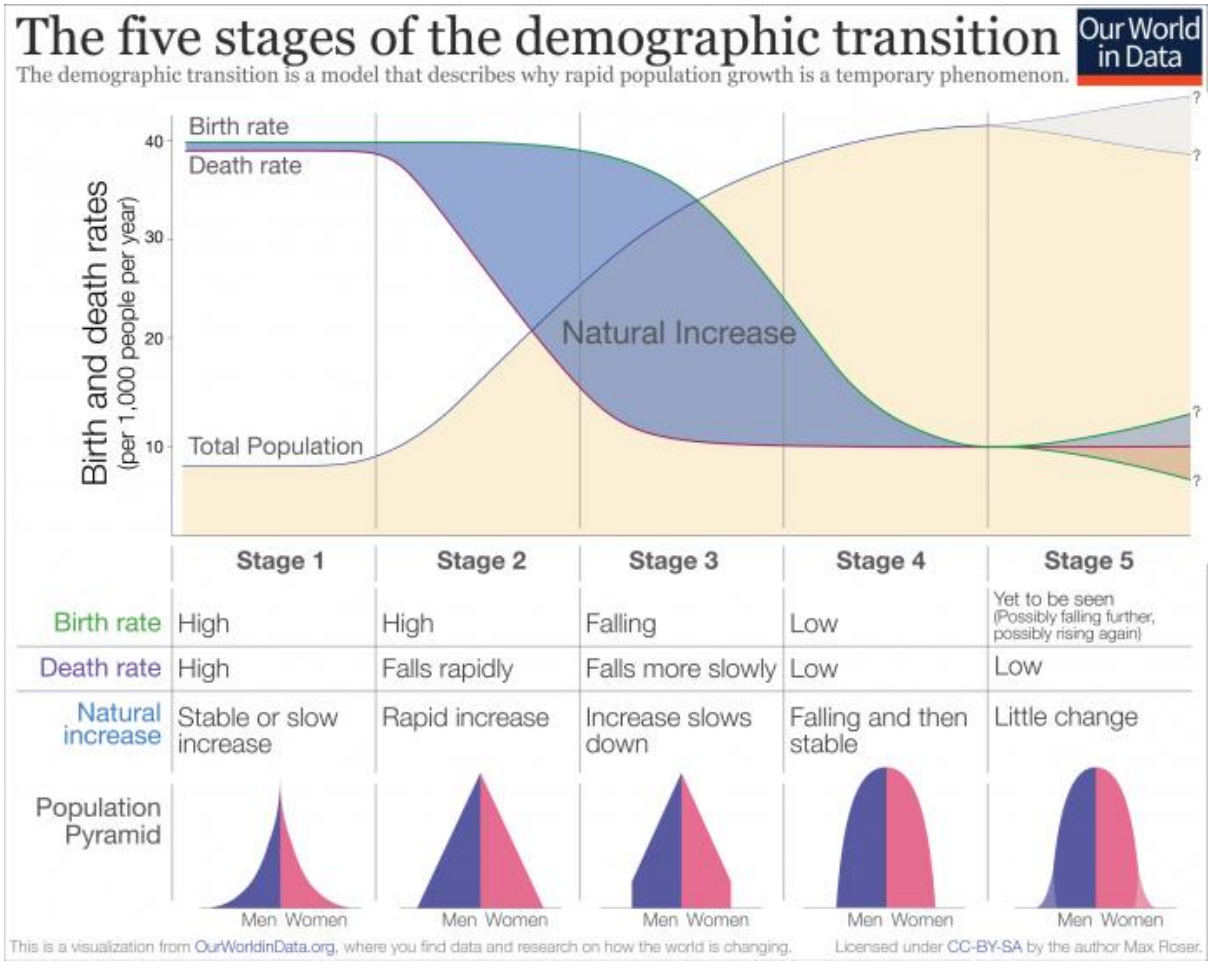
describes the reality through most of our history. Societies around the world remained in stage 1 for many millennia as the long-run perspective on extremely slow population growth highlighted. At this stage the population pyramid is broad at the base but since the mortality rate is high across all ages – and the risk of death is particularly high for children – the pyramid gets much narrower towards the top.

Stage 2: mortality falls but birth rates still high. In the second phase the health of the population slowly starts to improve and the death rate starts to fall. Since the health of the population has already improved, but fertility still remains as high as before, this is the stage of the transition at which the size of the population starts to grow rapidly. Historically it is the exceptional time at which the extended family with many (surviving) children is common.

Stage 3: mortality low and birth rates fall. Later the birth rate starts to fall and consequentially the rate at which the population grows begins to decline as well. When the mortality of children is not as high as it once was parents adapt to the healthier environment and choose to have fewer children; the economy is undergoing structural changes that makes children less economically valuable; and women are empowered socially and within partnerships and have fewer children than before.

Stage 4: mortality low and birth rates low. Rapid population growth comes to an end in stage 4 as the birth rate falls to a similar level as the already low mortality rate. The population pyramid is now box shaped; as the mortality rate at young ages is now very low the younger cohorts are now very similar in size and only at an old age the cohorts get smaller very rapidly.

Stage 5: mortality low and some evidence of rising fertility. The demographic transition describes changes over the course of socio-economic modernization.



Empirical evidence for the demographic transition

Rapid population growth is a temporary phenomenon

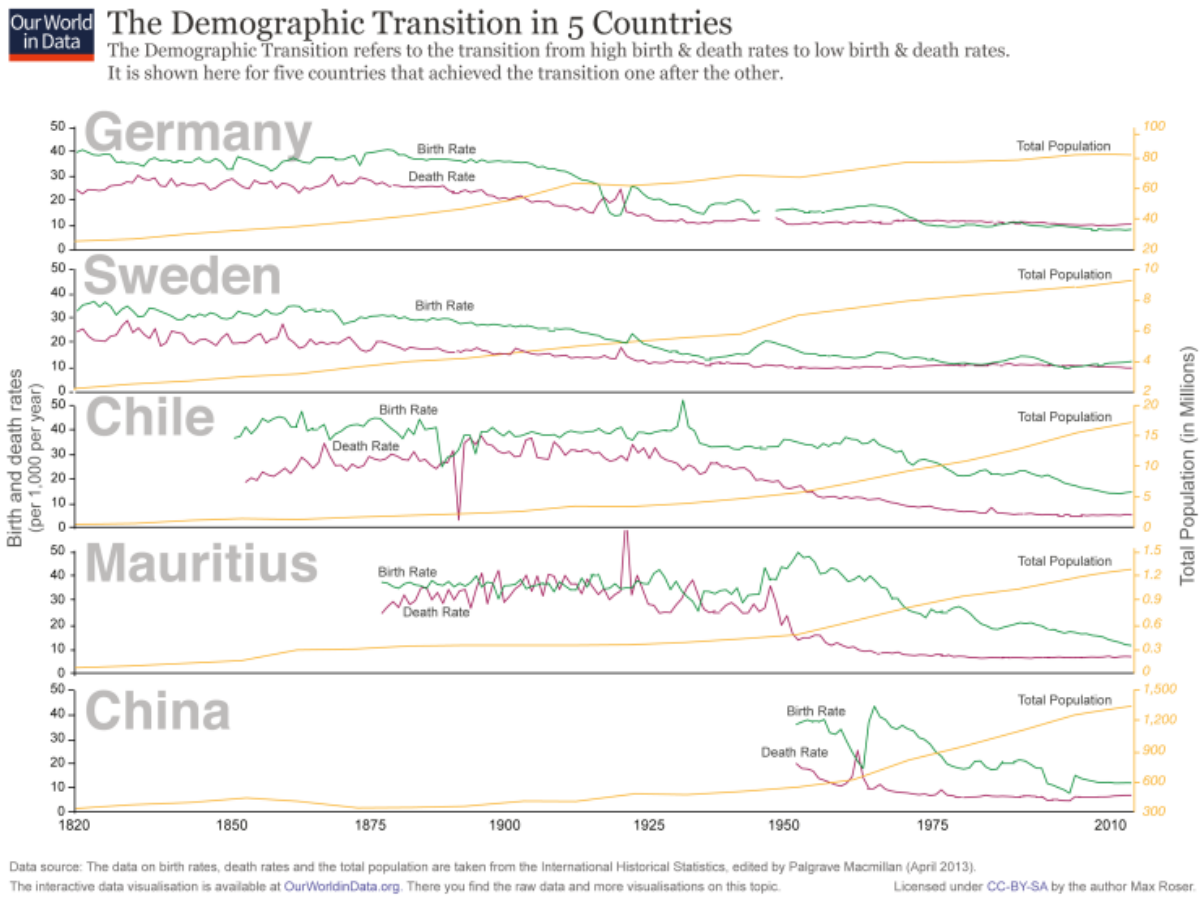
If fertility fell in lockstep with mortality, we would not have seen an increase in the population at all. The demographic transition works through the asynchronous timing of the two fundamental demographic changes: The decline of the death rate is followed by the decline of birth rates.

This decline of the death rate followed by a decline of the birth rate is something we observe with great regularity and independent of the culture or religion of the population.

The chart presents the empirical evidence for the demographic transition for five very different countries in Europe, Latin America, Africa, and Asia. In all countries we observed the pattern of the demographic transition, first a decline of mortality that starts the population boom and then a decline of fertility which brings the population boom to an end. The population boom is a temporary event.

In the past the size of the population was stagnant because of high mortality, now country after country is moving into a world in which the population is stagnant because of low fertility.

Demographic transition in 5 countries:



According to the researchers, “England is exceptionally fortunate in having several thousand parish registers that begin before 1600”; collectively, with their early start and breadth of coverage, these registers

form an excellent resource. As far as we know, there is no comparable data for any other country up until the mid-eighteenth century (see the following section for Sweden, where recordkeeping began in 1749).

The chart shows the birth and death rates in England and Wales over the span of nearly 500 years. It stitches together Wrigley and Schofield's data for the years 1541-1861 with two other sources up to 2015 (click on the chart's 'sources' tab for details). As we can see, a growing gap opens up between the birth and death rate after 1750, creating a population explosion. Around the 1870's, we begin to see the third stage of the demographic transition. As the birth rate starts to follow the death rate's decline, that gap between the two starts to shrink, slowing down the population growth rate.