

Population Growth and Economic Development (Part 1)

Ray, Chapter 9

Todaro-Smith, Chapter 6 (11th edn.)

- Some statistics:

<u>Year</u>	<u>World population</u>	<u>Years passed</u>
1804	1 billion	
1927	2 billion	123
1960	3 billion	33
1974	4 billion	14
1987	5 billion	13
1999	6 billion	12
2012	7 billion	13

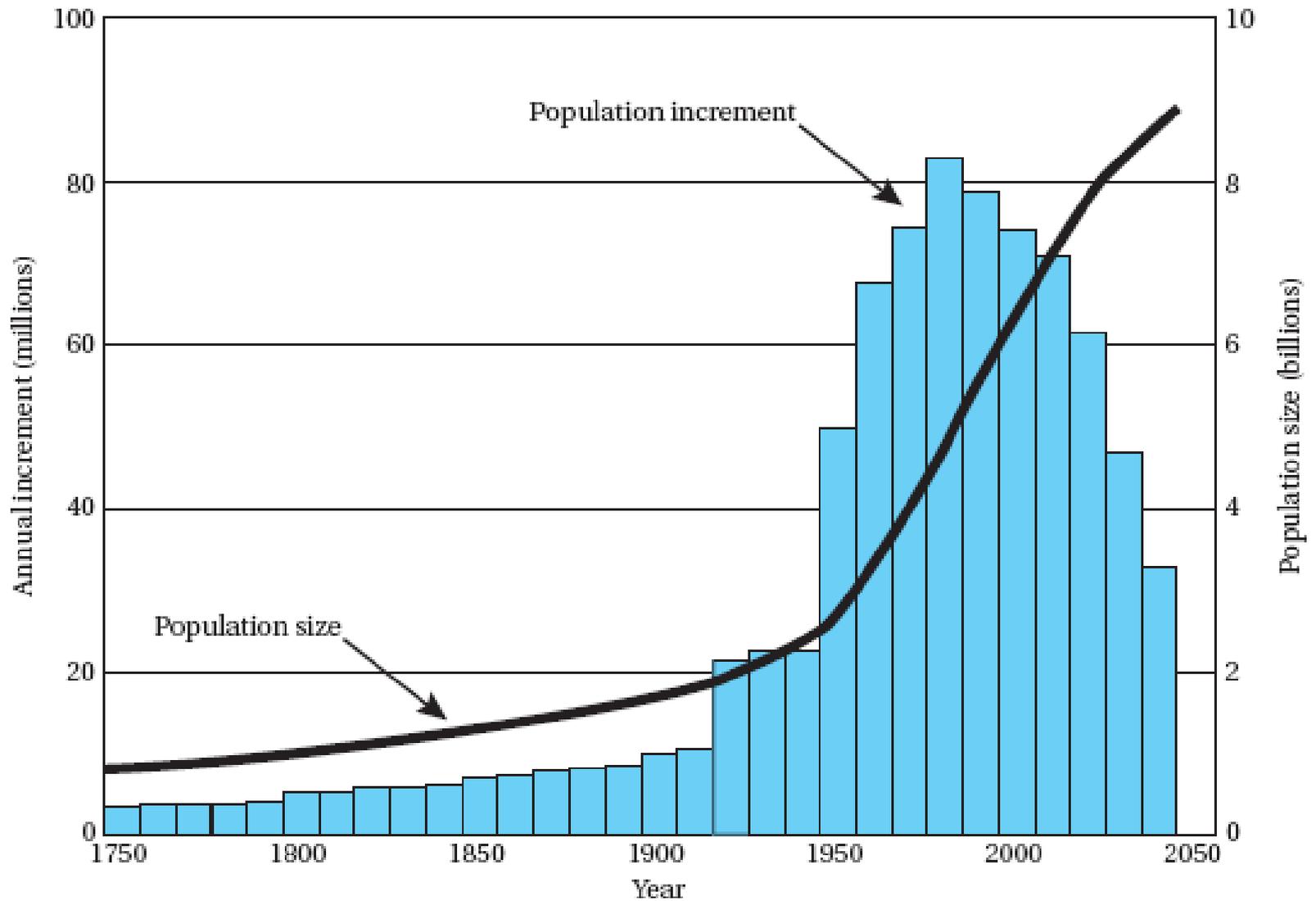
- Some statistics:

Year: 2009, World population: 6.7 billion.

Year: 2050, Population (projection): 9.2 billion.

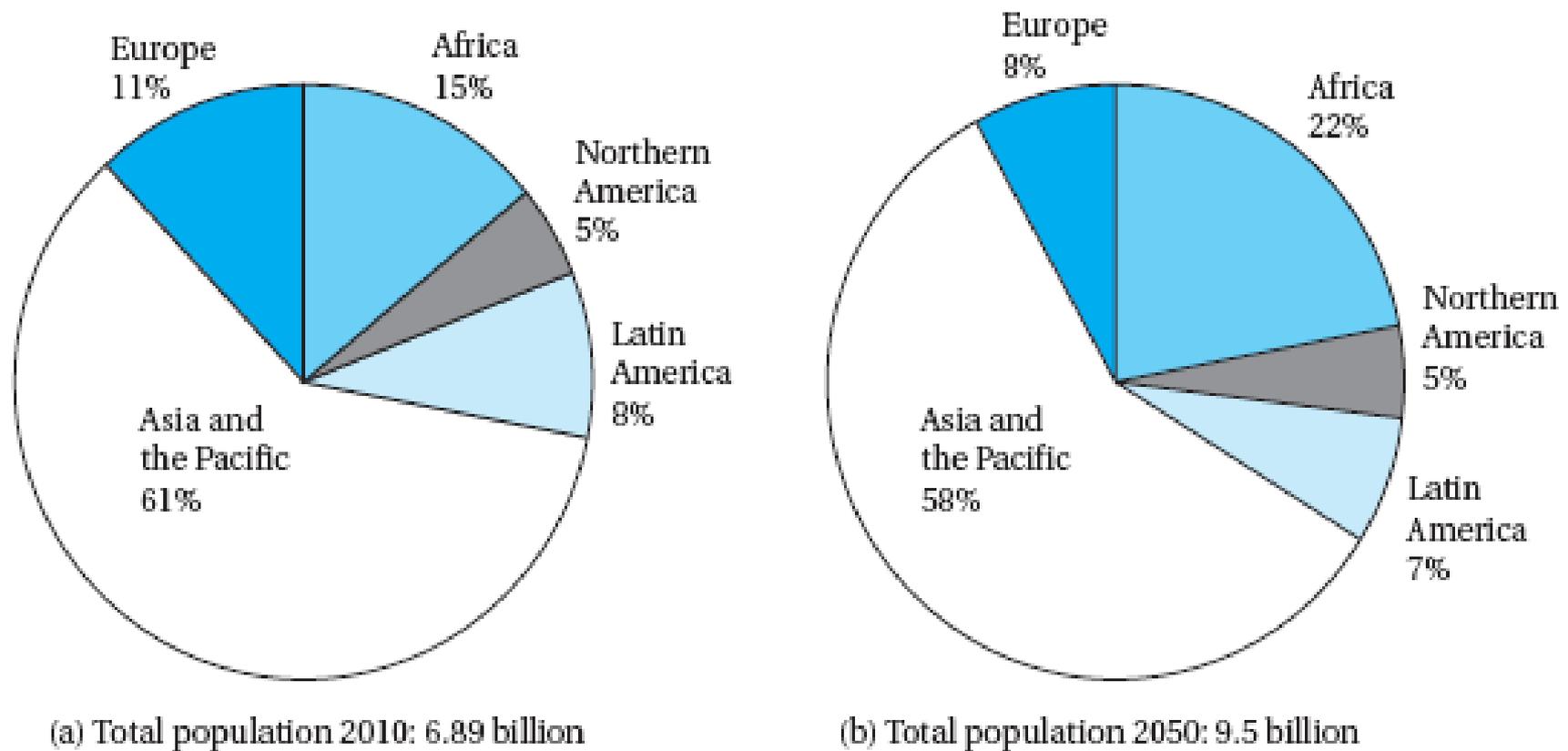
- Every year, more than 75 million people are being added to the world's population. Almost all of this net population increase (97%) is in developing countries.

FIGURE 6.1 World Population Growth, 1750–2050



Source: United Nations Population Division, *The World at Six Billion*, p. 7. Copyright © 2000 by the United Nations. Used with permission.

FIGURE 6.2 World Population Distribution by Region, 2010 and 2050



Source: Data from Population Reference Bureau, *World Population Data Sheet*, 2010.

Some Basic Concepts and Definitions (1)

- Birth rate (per thousand people)
- Death rate (per thousand people)
- Population growth rate = Birth rate - Death rate

At very low levels of per capita income, both birth and death rates are high.

Then death rates fall.

This is followed by a fall in the birth rates.

Some Statistics (year 1992) :

	Country	Per cap income	Birth rate	Death rate	Pop growth rate (%)
I	Mali	520	51	20	3.1
	Sierra Leone	750	49	25	2.4
II	Kenya	1290	45	12	3.3
	Nigeria	1400	45	15	3.0
	Pakistan	2170	41	9	3.2
III	India	1220	29	10	1.9
	Bangladesh	1290	36	12	2.4
IV	China	2330	18	7	1.1
	Sri Lanka	2990	21	6	1.5
V	Brazil	5370	25	8	1.7
	Colombia	5490	24	6	1.8
VI	Thailand	6260	19	6	1.3
	Korea	9630	16	6	1.0

Some Basic Concepts and Definitions (2)

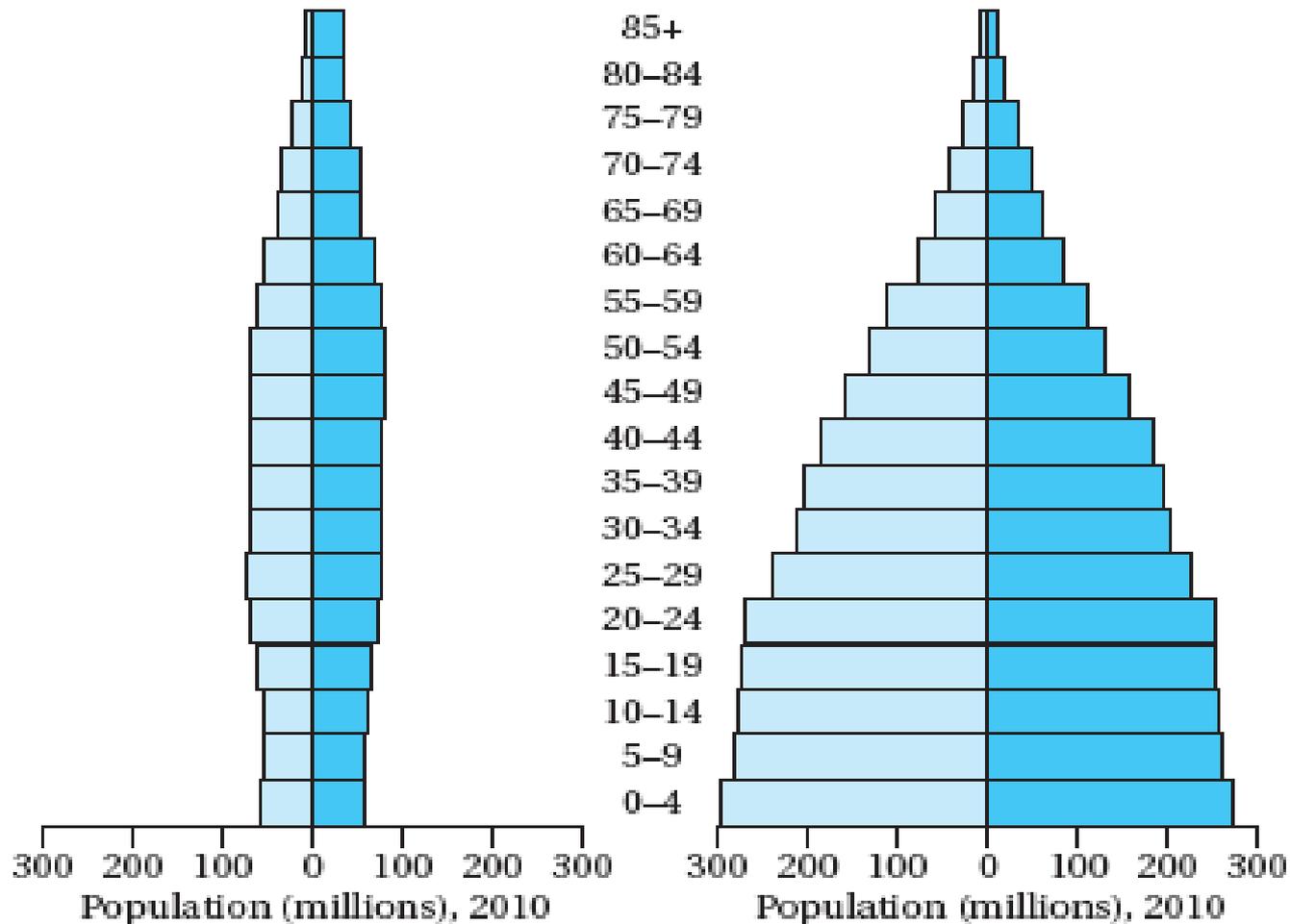
- Population growth rate is an important statistic, but it hides information about the underlying demographic structure.
- Two countries with the same population growth rates may be very different in terms of age structures. (One may have higher birth and death rates than the other. Age structures will differ. Compare Sierra Leone to Bangladesh, both of which have the same pop.growth rate.)
- Developing countries are very young.

Population pyramids: Developed vs. Developing countries

Developed Countries

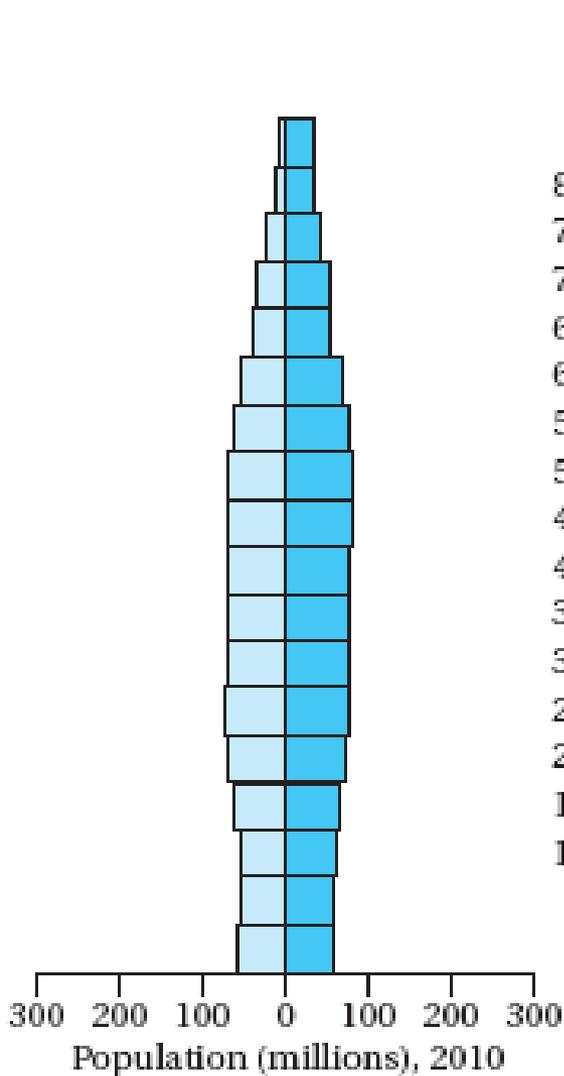
Developing Countries

Age

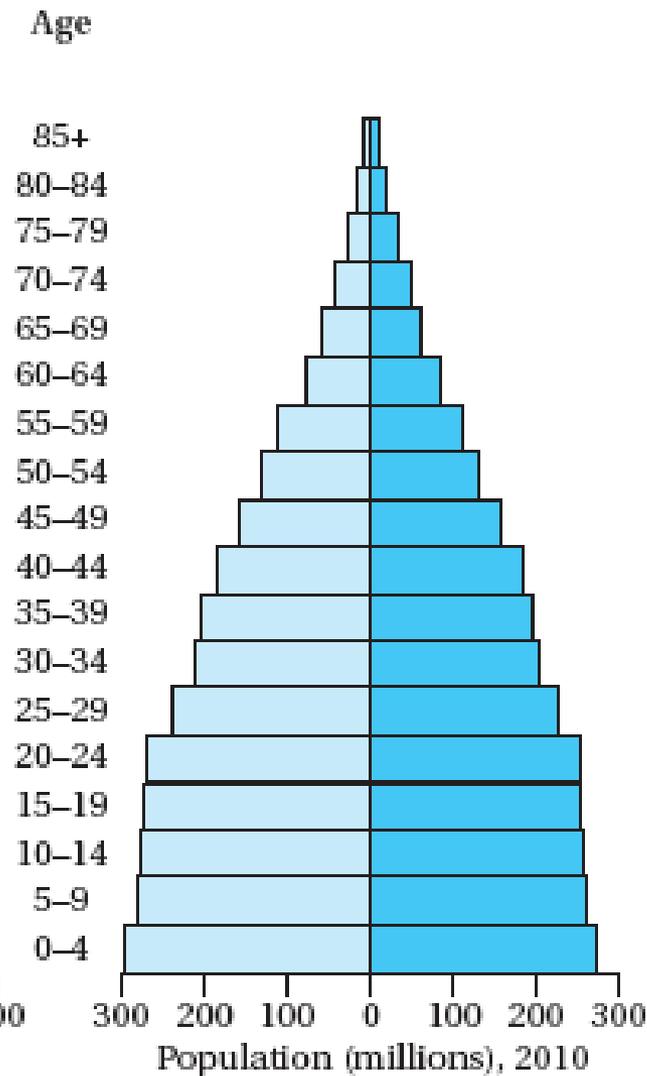


Population pyramids: Developed and developing countries vs. Ethiopia

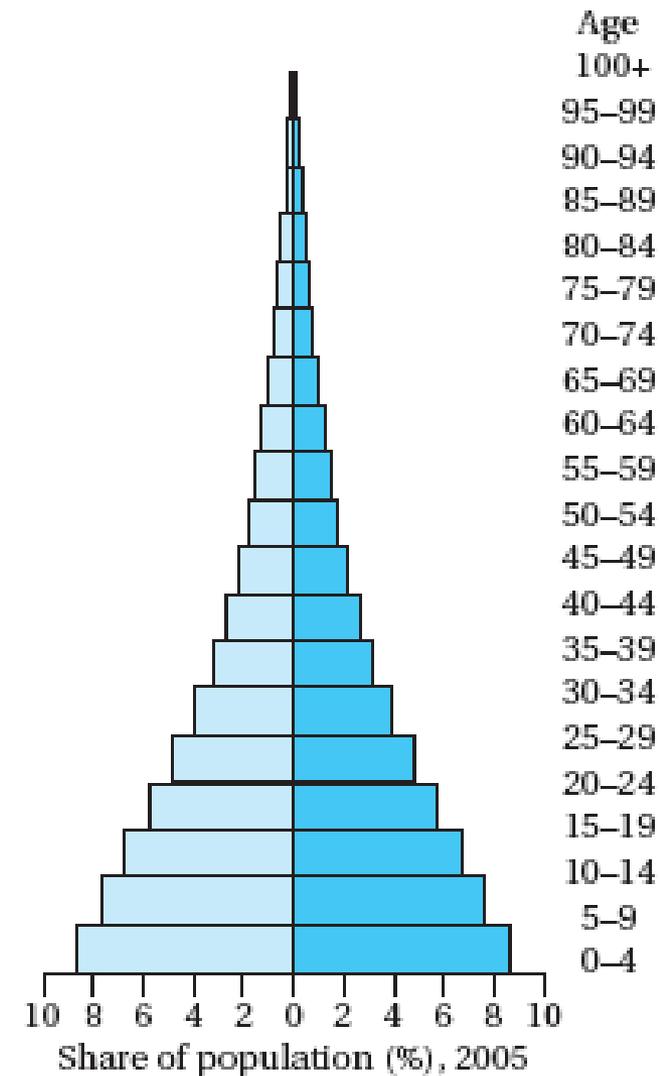
Developed Countries



Developing Countries



Ethiopia: Rapid Growth



Some Basic Concepts and Definitions (3)

Age-specific fertility rate: Average # of children born to women in a particular age group.

Total fertility rate: Total # of children a woman is expected to have over her lifetime. (*The number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children at each age in accordance with prevailing age-specific fertility rates.*)

This is a synthetic rate, not based on the fertility of any real group of women, since this would involve waiting until they had completed childbearing.

TABLE 6.3 Fertility Rate for Selected Countries, 1970 and 2009

Country	Total Fertility Rate ^a	
	1970	2009
Bangladesh	7.0	2.3
Colombia	5.3	2.5
Indonesia	5.5	2.4
Jamaica	5.3	2.4
Mexico	4.9	2.3
Thailand	5.5	1.8
Zimbabwe	7.7	3.9

Sources: World Bank, *World Development Report, 1994* (New York: Oxford University Press, 1994), tab. 26; Population Reference Bureau, *World Population Data Sheet* (Washington, D.C.: Population Reference Bureau, 2009).

^aAverage number of children born to women who live beyond age 49.

Some Basic Concepts and Definitions (4)

Age distribution of a population tells us the shares of the population in different age groups.

Birth and death rates  Age distribution

The aggregate birth rate is a function of the age distribution in a country and the age-specific fertility rates of women.

The aggregate death rate is a function of the age distribution in a country and the age-specific death rates.

Some Basic Concepts and Definitions (5)

→ Even when total fertility rate is low, a country can have a high birth rate if a large percentage of the population is in their reproductive years.

(Total fertility rate is not the only factor that determines the overall birth rate.)

Example:

Country (1991 data)	Total fertility rate	Birth rate (per 1000 population)
Argentina	2.8	21
Brazil	2.8	24
Azerbaijan	2.8	27

Source: WDR ,1993.

Some Basic Concepts and Definitions (6)

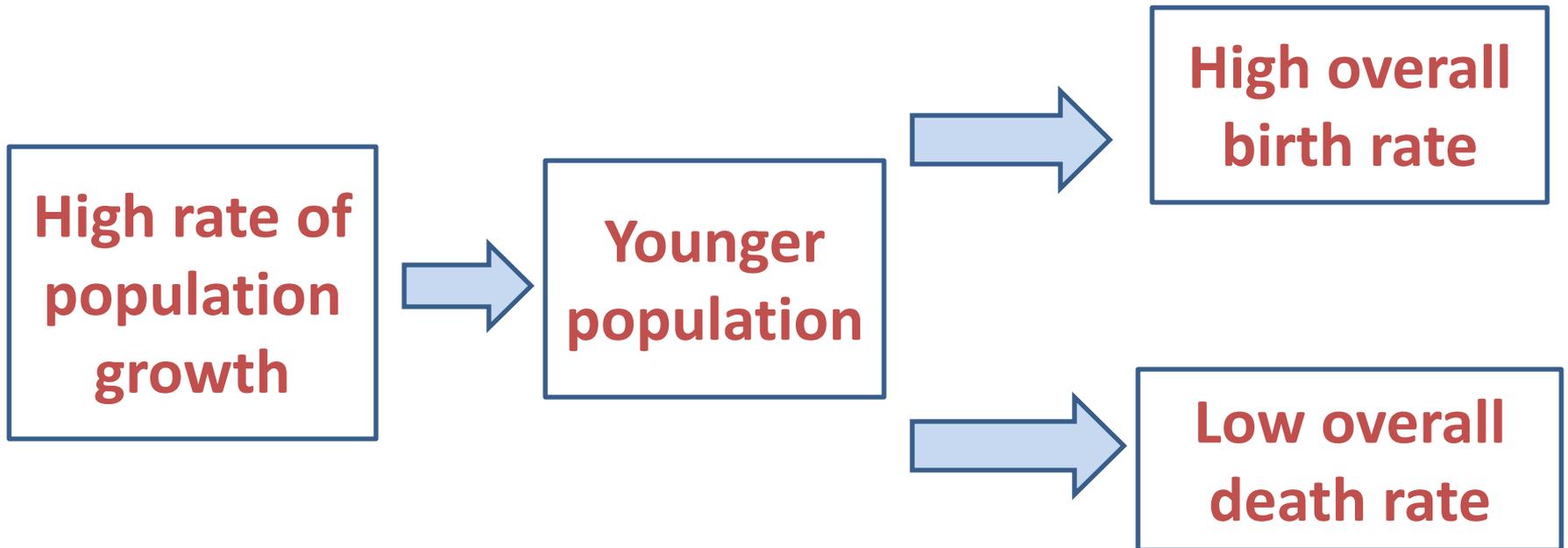
Similarly, even when age-specific death rates are high, a country can have a low overall death rate if a large percentage of the population is young.

These are the effects of a young population at work.

Example: Suppose we estimate total death rate by multiplying shares of age groups by age-specific death rates.

	Age groups	Share in population (%)	Age-specific death rate	Total death rate
Young country	Young	65	6	13.7
	Old	35	28	
Old country	Young	40	4	16.6
	Old	60	25	

Some Basic Concepts and Definitions (7)



The demographic transition (1)

The “carrying capacity” of the world went up with the advent of agriculture. World population started increasing. Birth rates were high but death rates were high as well, which kept the population growth rate low.
(The 1st phase of demographic history)

The demographic transition (2)

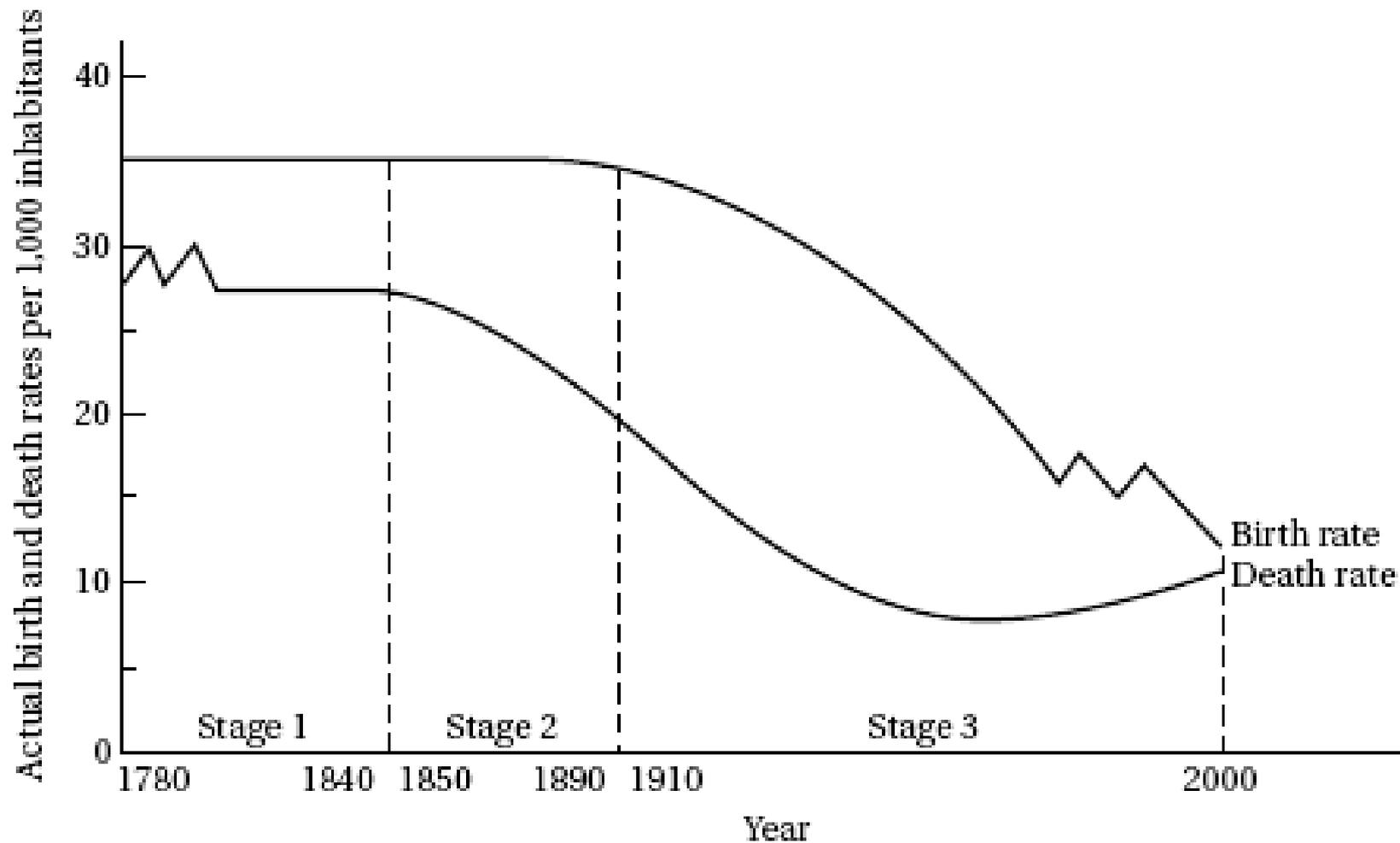
With the advent of sanitation and improvements in medicine, death rates began to fall around year 1700. Birth rates did not go down with the death rates for two reasons: 1) increases in productivity enabled families to feed more children, 2) micro inertia.

(The 2nd phase of demographic history)

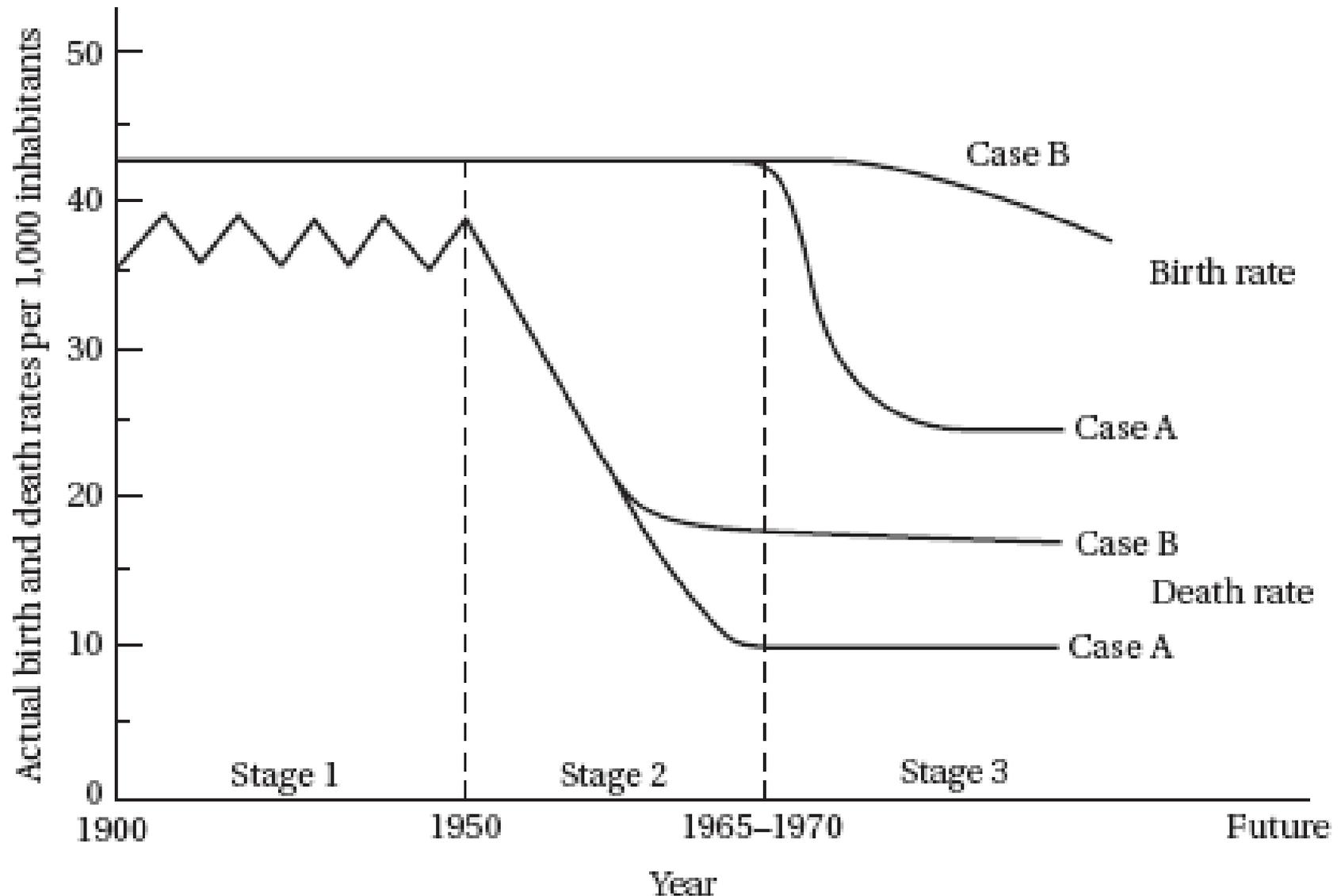
Recently, birth rates fell and so did population growth rate, which is around 0.7% per year.

(The 3rd --and final-- phase of demographic history)

FIGURE 6.5 The Demographic Transition in Western Europe



The Demographic Transition in Developing Countries



- Examples for Case A countries:
Taiwan, South Korea, Costa Rica, China, Cuba, Chile,
and Sri Lanka
- Examples for Case B countries:
Many countries in the sub-Saharan Africa and the
Middle East.

Population growth has a high degree of inertia (1)

- Macro inertia

If both birth and death rates are higher in a poor country than in a rich country, both may have about the same population growth rates, but the poor country will have a younger population, which will tend to keep birth rates high even if fertility rates are reduced.

(The inertia of the age distribution)

Population growth has a high degree of inertia (2)

- Micro inertia (Inertia at the household level)

Children are generally a substitute for various missing institutions and markets. Social security, employer-subsidized retirement plan, medical insurance, life insurance, a banking system that encourages savings...

Children are assets. They embody income-earning possibilities, both now and in the future.

Individuals who lack insurance and old-age security may choose to invest in children.

- Micro inertia

What is the probability that a child will grow up to look after his parents? Influenced by:

1. Probability of death in infancy or in childhood
(Infant mortality rate is around 150-200/1000 in developing countries. Childhood diseases are a significant killer up to age five.)
2. Probability that the child is a poor earner.
3. Prob. that the child does not care about parents.
4. Probability that the parents die young.

- Micro inertia

Let “ p ” be the the probability that a child will grow up to look after his parents.

Let “ q ” be the threshold probability that a couple finds acceptable of receiving support from at least one child.

Question: How many children do you need to have to make sure that the overall probability that you receive support from at least one child is at least q ?

- Micro inertia

$(1-p)$: Prob that a child will not look after you.

$(1-p)^n$: Prob that n children will not look after you.

So, n should be large enough to make sure that

$$1 - (1-p)^n > q$$

If, say $p = 1/2$ and $q = 9/10$, then n must be at least 4.

If you are more risk averse so that your acceptable q is 0.95, then n is 5!

- Micro inertia

Gender bias ?

If families want to receive support from a male child, then n becomes the desired number of male children. Then, the desired number of children doubles.