Population Dynamics and Sustainable Development

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Outline of the presentation

- Review of the demographic transition

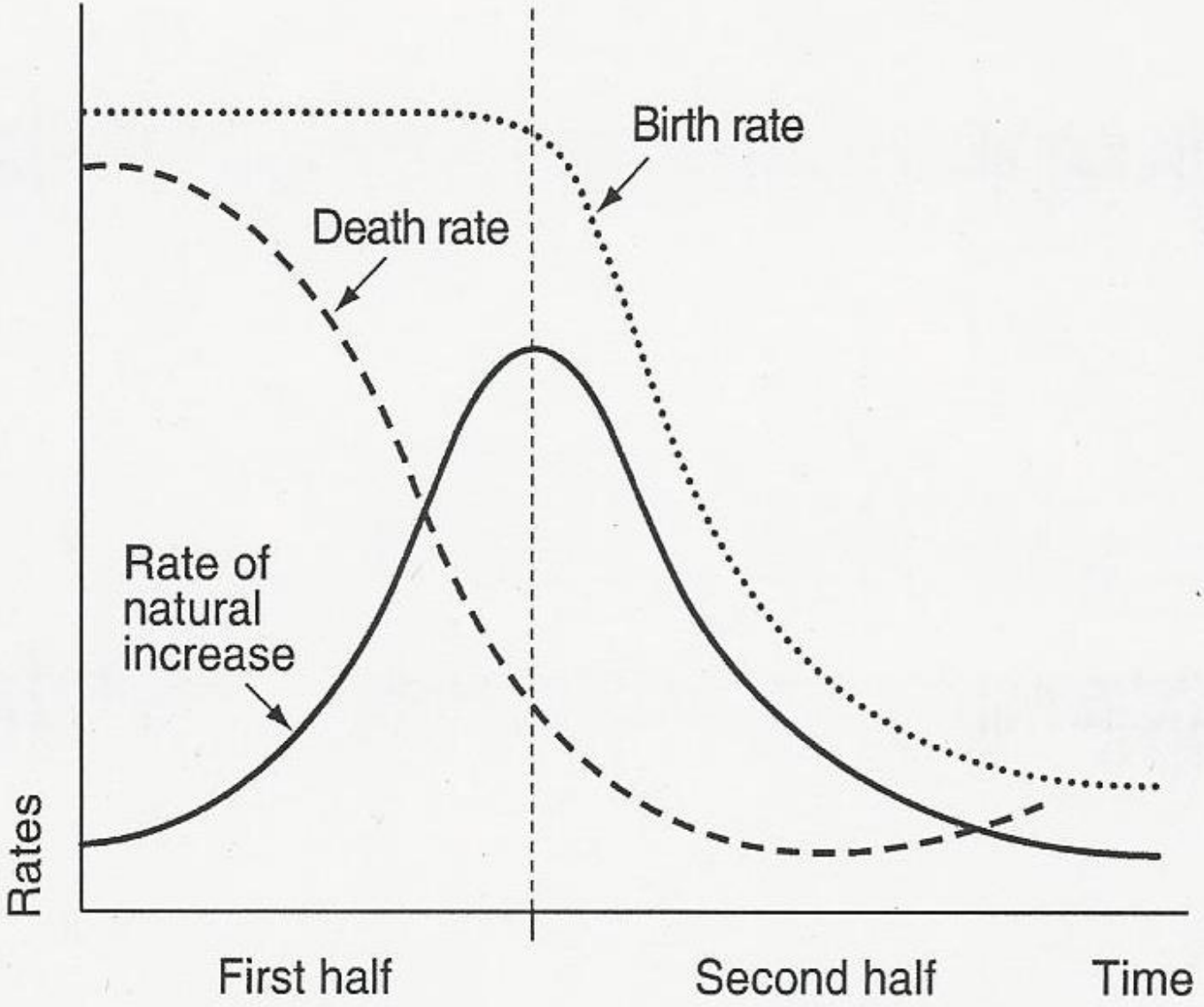
- Implications of population change for development
    1. The urban sector
    2. The environment
    3. The economy
    4. Marriage and gender relations

The five main processes of the demographic transition

1. **Mortality decline**
2. **Natural increase (population growth)**
3. **Fertility decline**
4. **Urbanization (including urban growth)**
5. **Population ageing**

These processes can be *conditione*d by many factors, but given mortality decline they will eventually unfold largely independently of other factors

Stylized depiction of the demographic transition



Major facts about global population trends

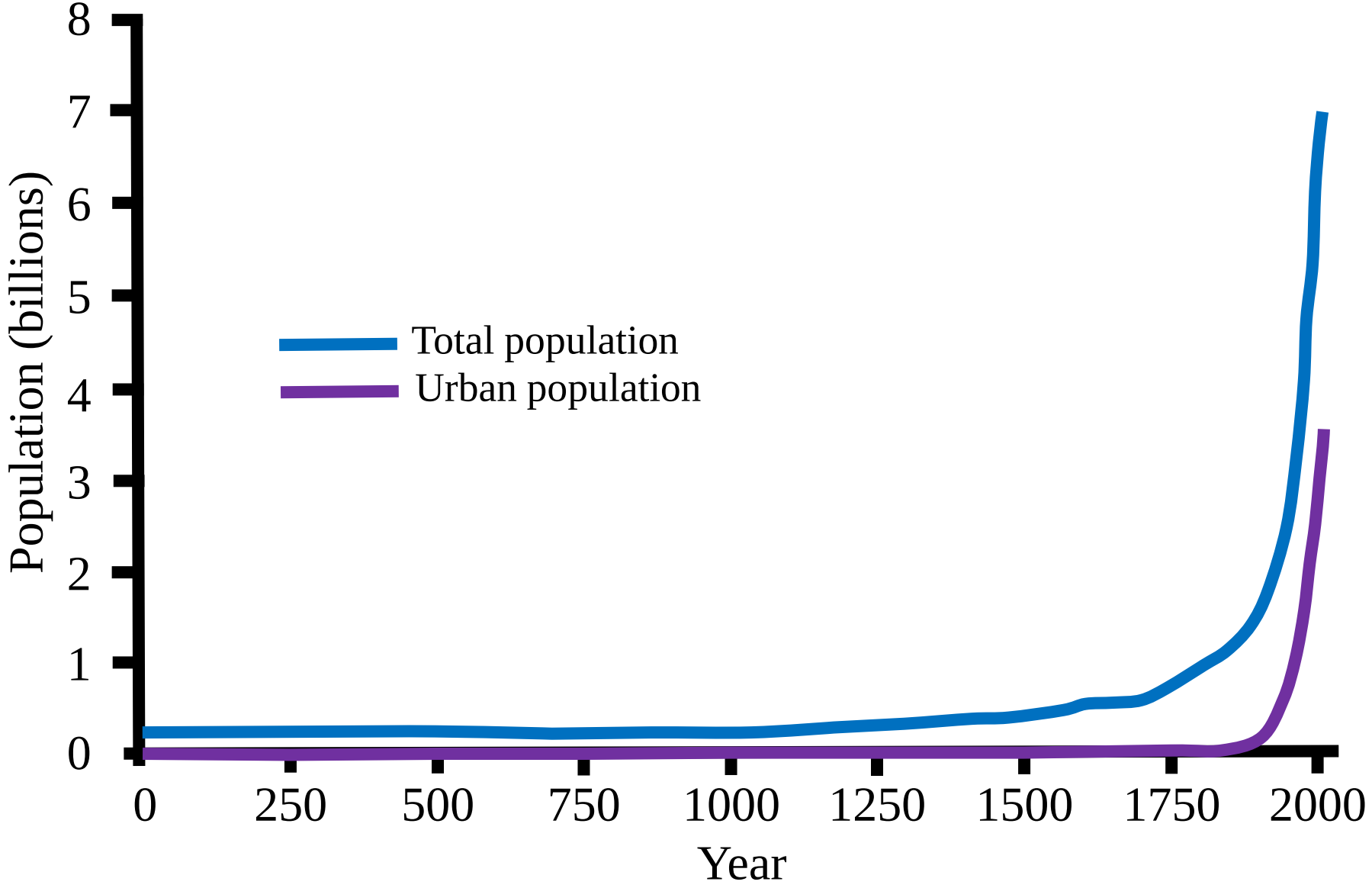
a) **We still live in a world of exceptional population growth.**

Year	**World Population (UN estimates and 'medium' projections)**
1950	**2.5 billion**
2015	**7.3 billion**
2050	**9.6 billion**
2100	**10.9 billion**

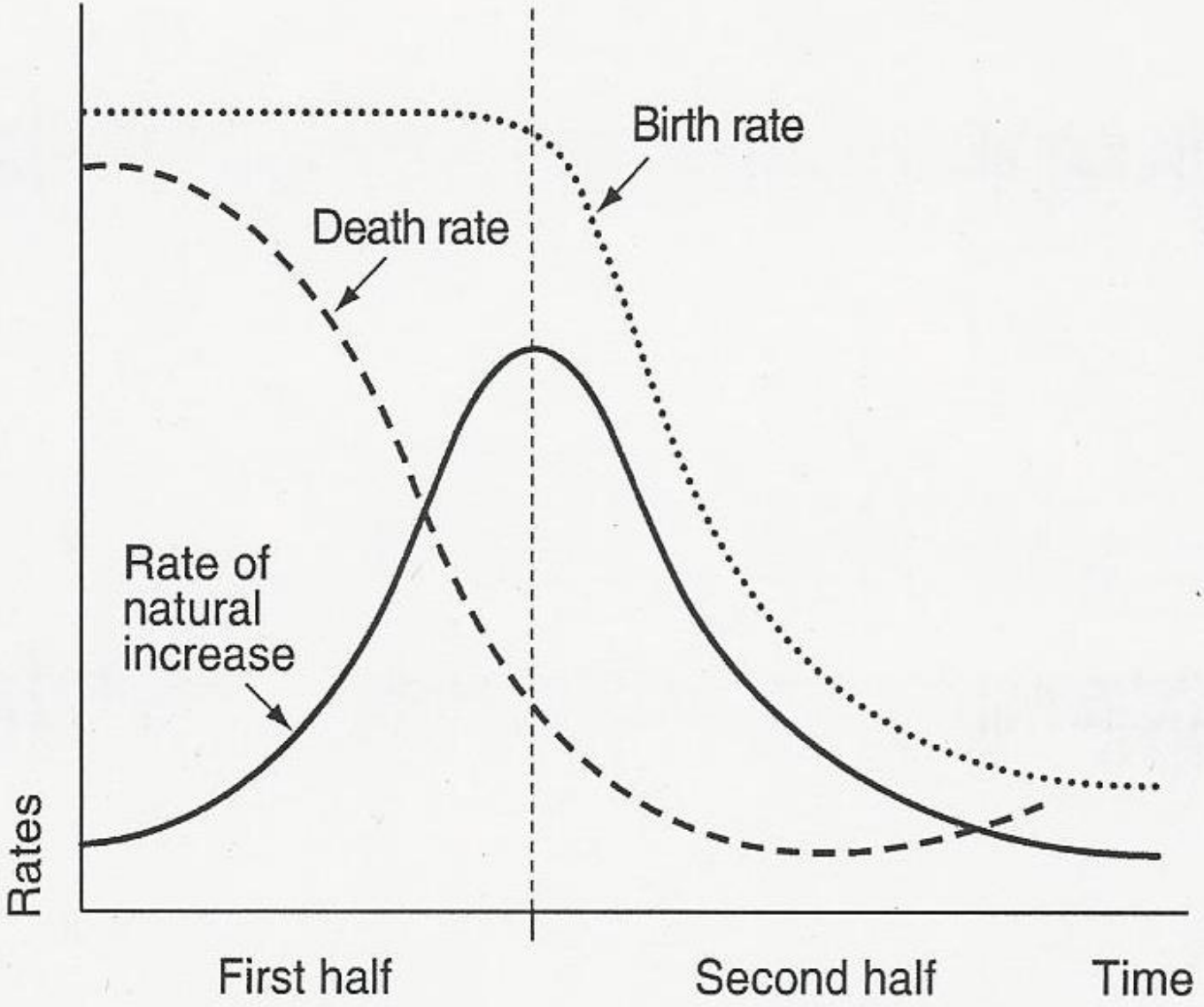
b) **We live in a world of unprecedented demographic diversity.**

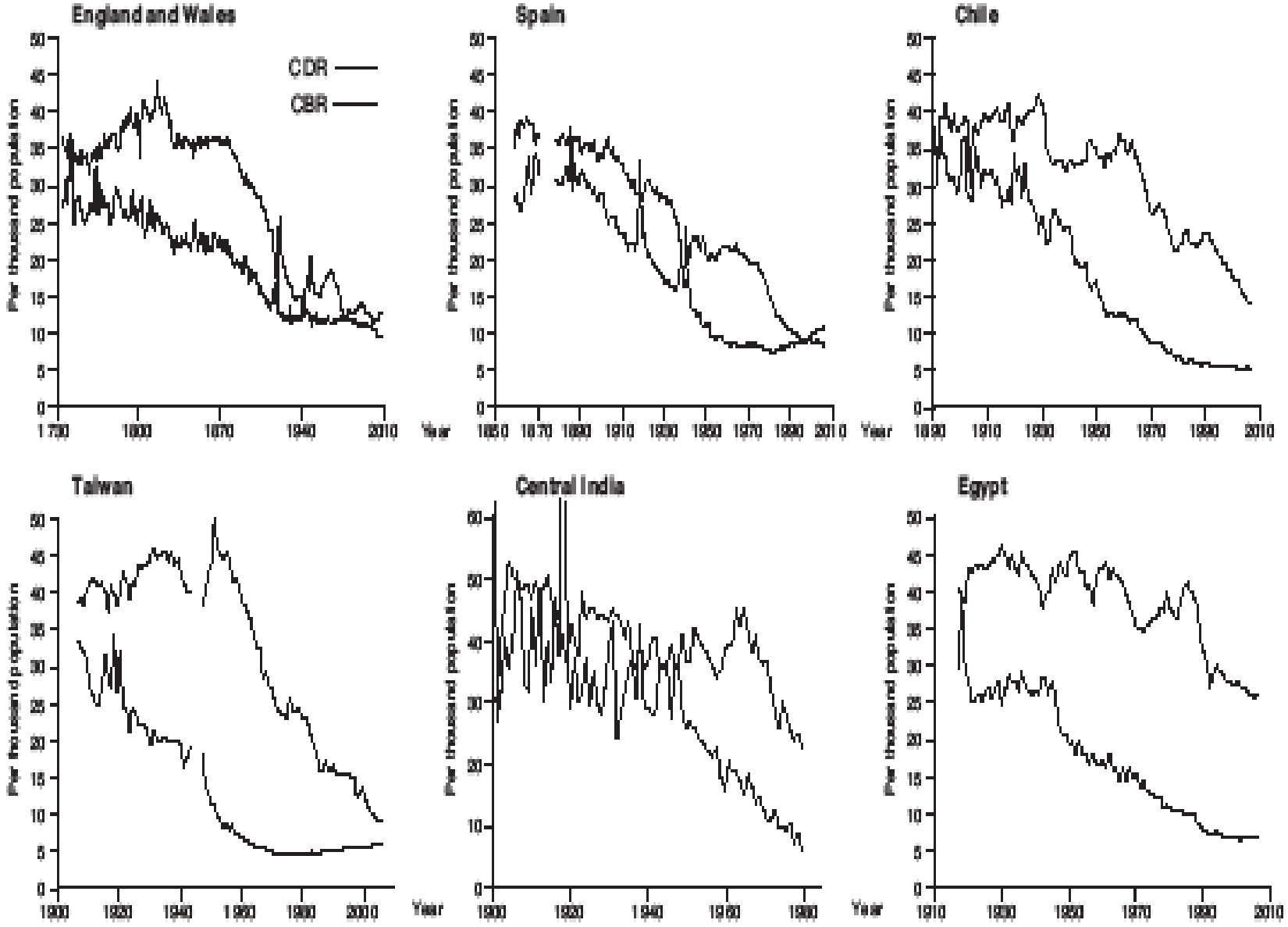
c) **The framework of the transition leaves little doubt that fertility will eventually fall to low levels everywhere.**

World population and urban growth over two millennia

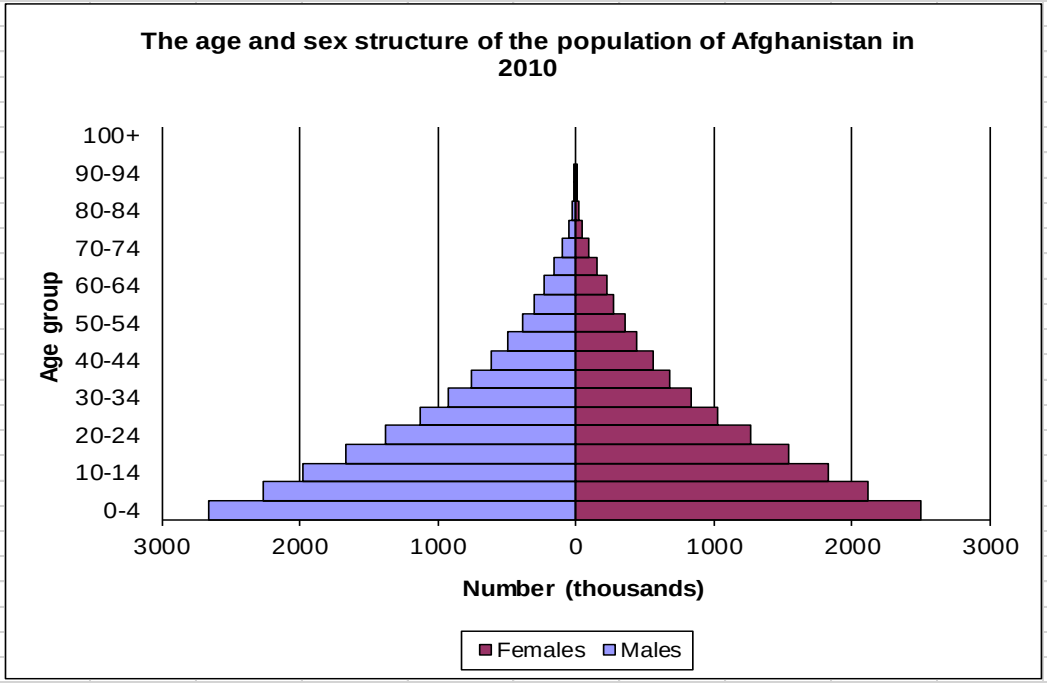


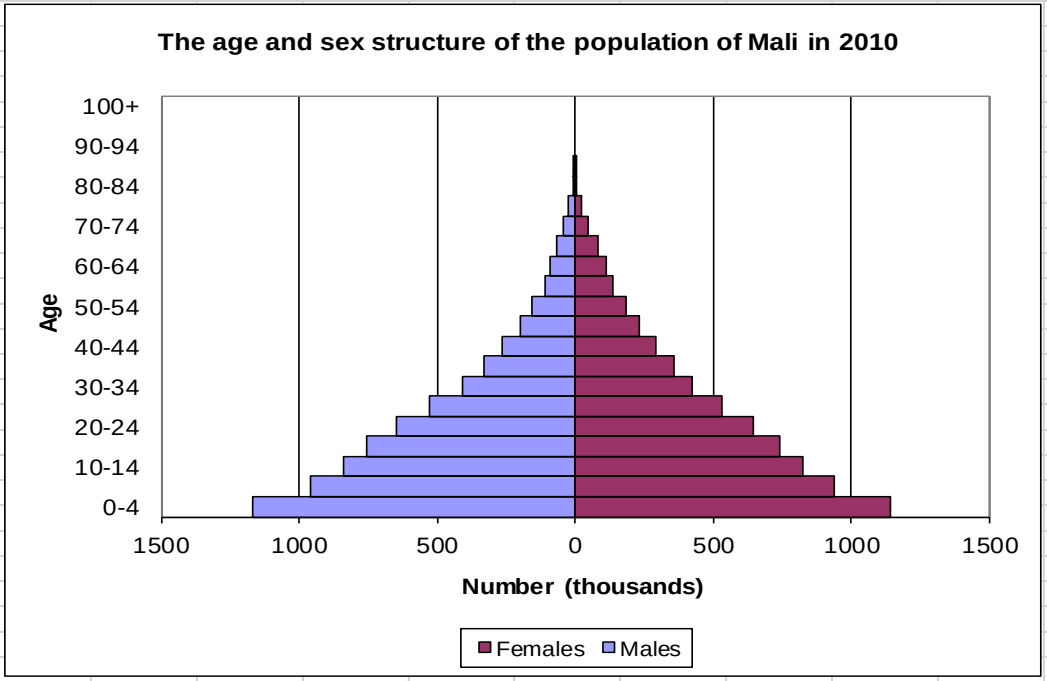
Stylized depiction of the demographic transition

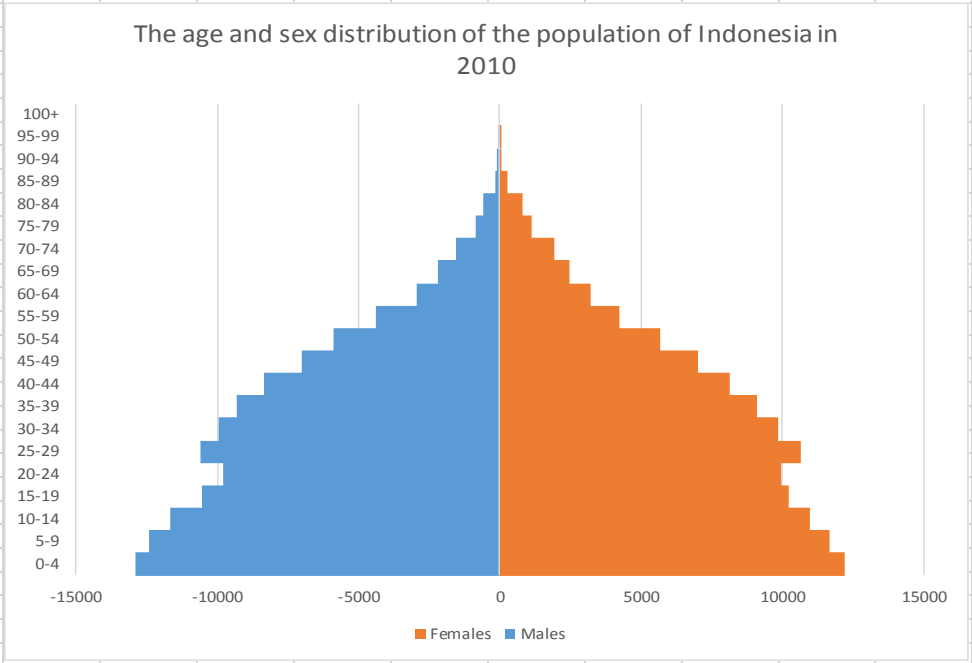


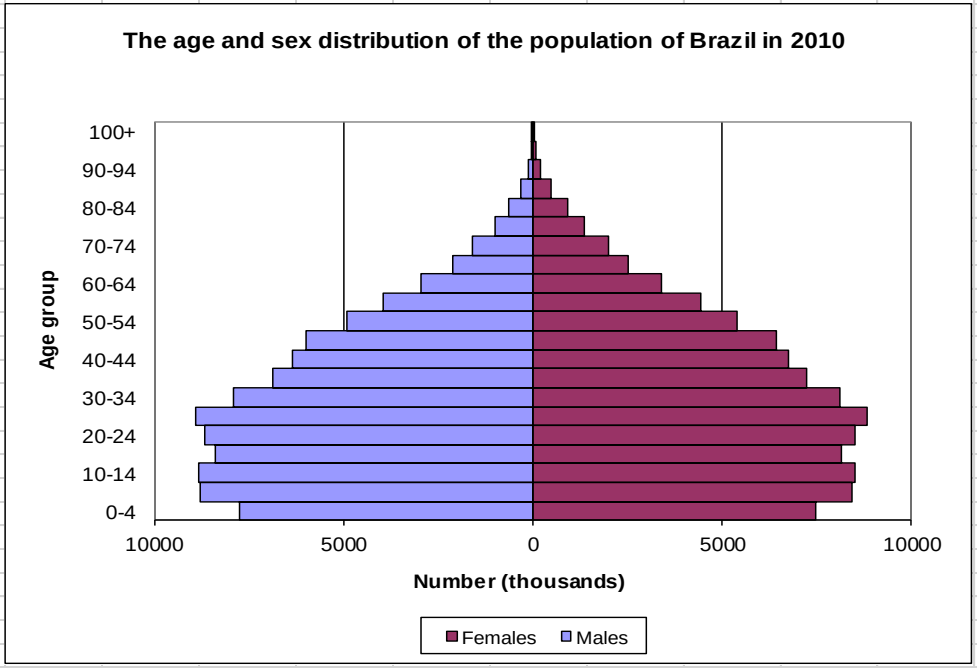


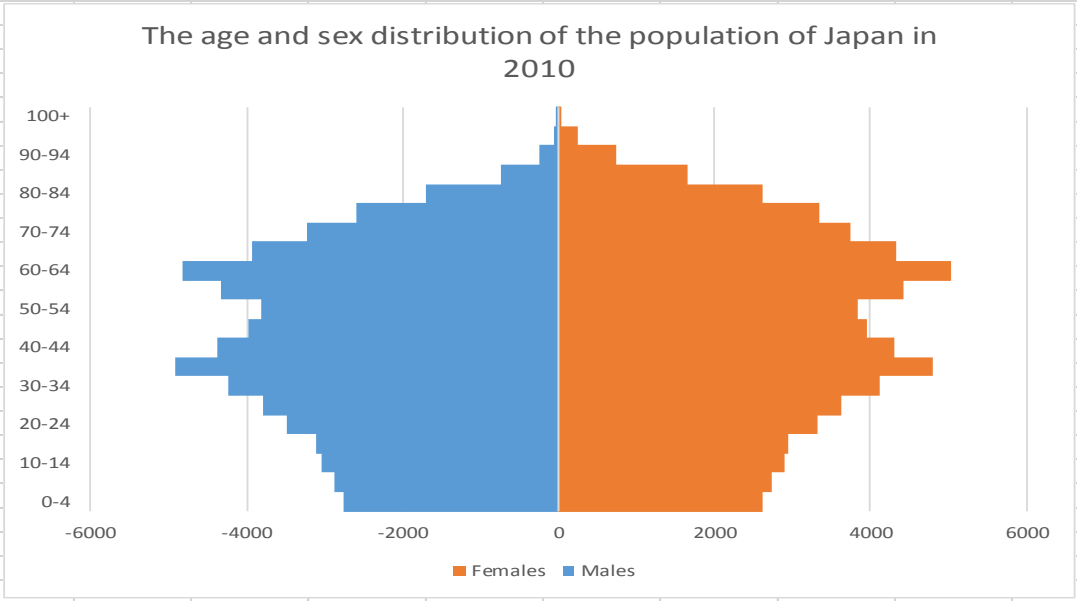
Principal sources: England and Wales (Wrigley and Schofield 1981; Chesnais 1992; ONS 2009); Spain (Chesnais 1992); Chile (Mitchell 1983; INE-CELADE 2000); Taiwan (Mitchell 1992; Republic of China 2007); Central India (Dyson 1989); Egypt (Chesnais 1992). Rates were also taken from United Nations *Demographic Yearbook* (various years).

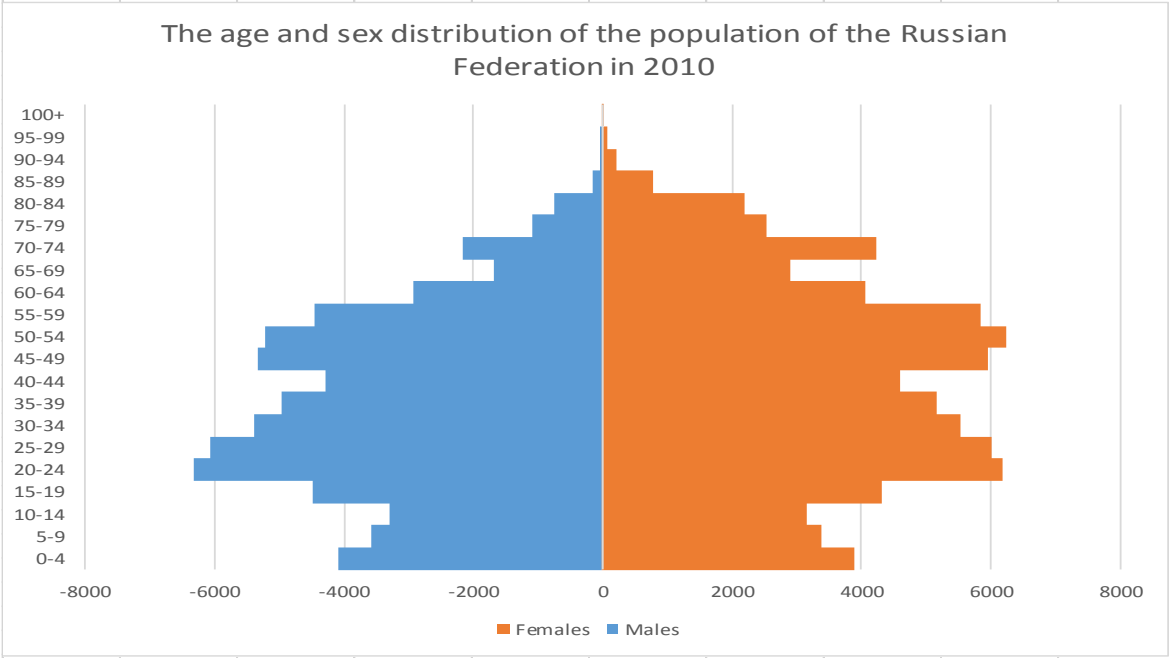

The age and sex structure of the population of Afghanistan in 2010
Age group
100+
90-94
80-84
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
3000
2000
1000
0
1000
2000
3000
Number (thousands)
Females
Males

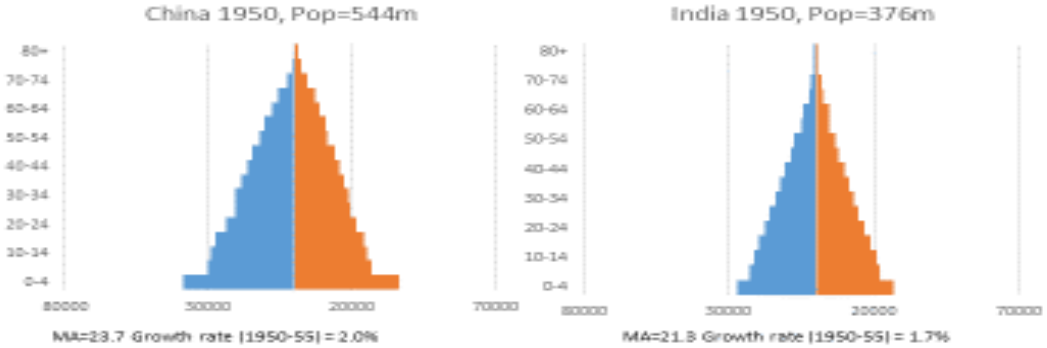

The age and sex structure of the population of Mali in 2010
Age
100+
90-94
80-84
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
1500
1000
500
0
500
1000
1500
Number (thousands)
Females
Males

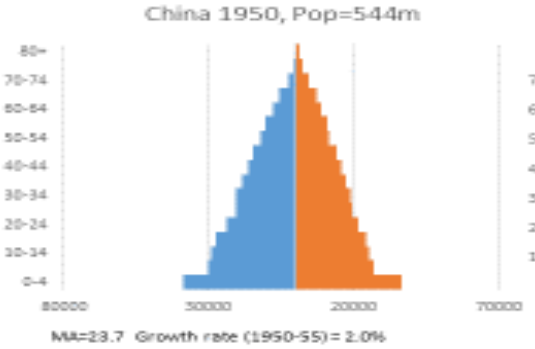

The age and sex distribution of the population of Indonesia in 2010
100+
95-99
90-94
85-89
80-84
75-79
70-74
65-69
60-64
55-59
50-54
45-49
40-44
35-39
30-34
25-29
20-24
15-19
10-14
5-9
0-4
-15000
-10000
-5000
0
5000
10000
15000
Females
Males


The age and sex distribution of the population of Brazil in 2010
Age group
100+
90-94
80-84
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
10000
5000
0
5000
10000
Number (thousands)
Females
Males

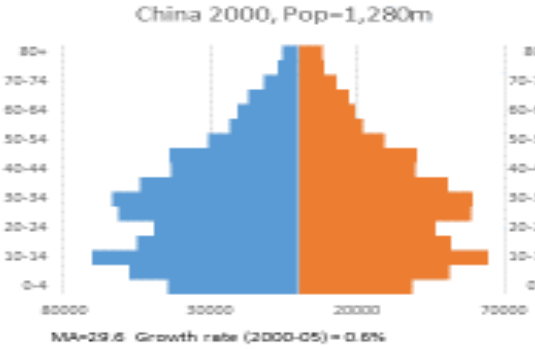

The age and sex distribution of the population of Japan in 2010
100+
90-94
80-84
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
-6000
-4000
-2000
0
2000
4000
6000
Females
Males

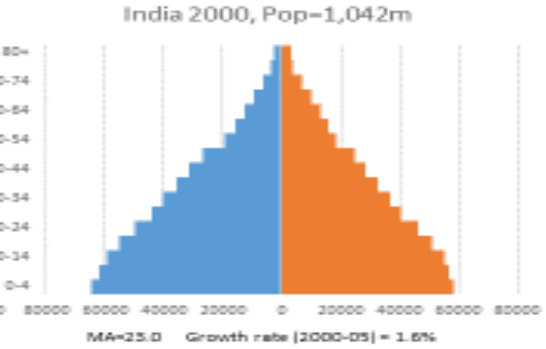

The age and sex distribution of the population of the Russian Federation in 2010
100+
95-99
90-94
85-89
80-84
75-79
70-74
65-69
60-64
55-59
50-54
45-49
40-44
35-39
30-34
25-29
20-24
15-19
10-14
5-9
0-4
-8000
-6000
-4000
-2000
0
2000
4000
6000
8000
Females
Males

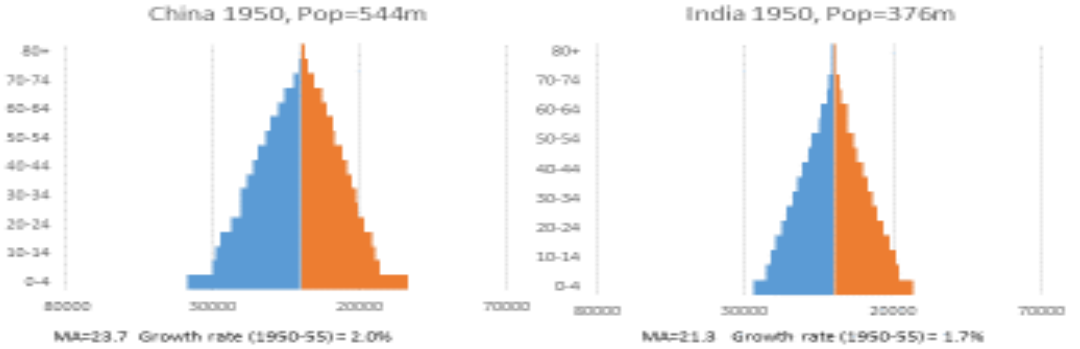

China 1950, Pop=544m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
80000
50000
20000
70000
MA=23.7 Growth rate (1950-55) = 2.0%
India 1950, Pop=376m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
80000
50000
20000
70000
MA=21.8 Growth rate (1950-55) = 1.7%


China 1950, Pop=544m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
80000
50000
20000
70000
MA=23.7 Growth rate (1950-55) = 2.0%

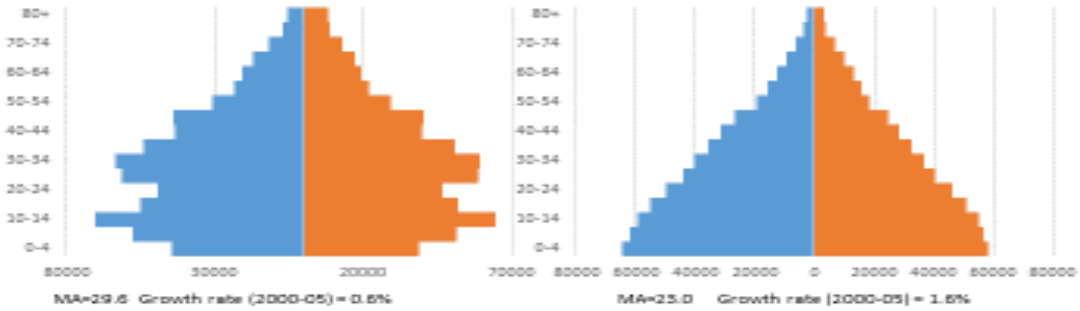

India 1950, Pop=376m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
80000
50000
20000
70000
MA=21.3 Growth rate (1950-55) = 1.7%


China 2000, Pop=1,280m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
80000
50000
20000
70000
MA=29.6 Growth rate (2000-05) = 0.6%

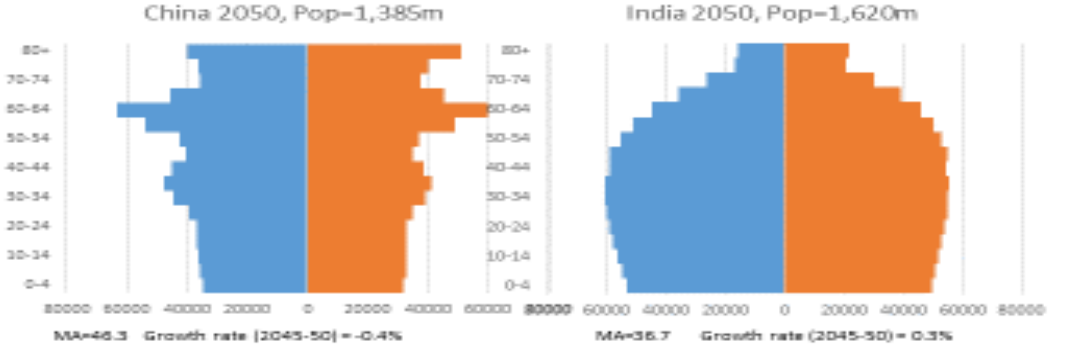

India 2000, Pop=1,042m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
80000
60000
40000
20000
0
20000
40000
60000
80000
MA=25.0 Growth rate (2000-05) = 1.6%


China 1950, Pop=544m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
80000
50000
20000
70000
MA=23.7 Growth rate (1950-55) = 2.0%

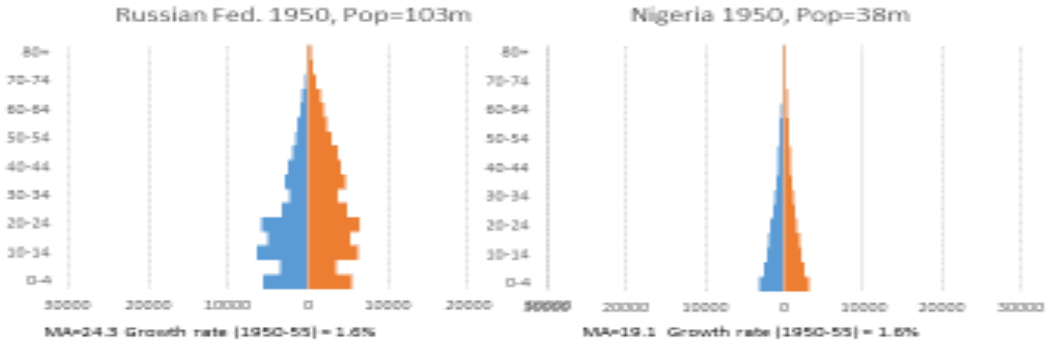
India 1950, Pop=376m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
80000
50000
20000
70000
MA=21.3 Growth rate (1950-55) = 1.7%


China 2000, Pop=1,280m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
80000
50000
20000
70000
MA=29.6 Growth rate (2000-05) = 0.6%

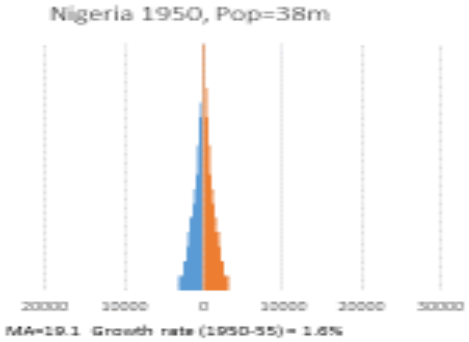
India 2000, Pop=1,042m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
80000
60000
40000
20000
0
20000
40000
60000
80000
MA=25.0 Growth rate (2000-05) = 1.6%


China 2050, Pop=1,385m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
80000
60000
40000
20000
0
20000
40000
60000
80000
MA=46.3 Growth rate (2045-50) = -0.4%

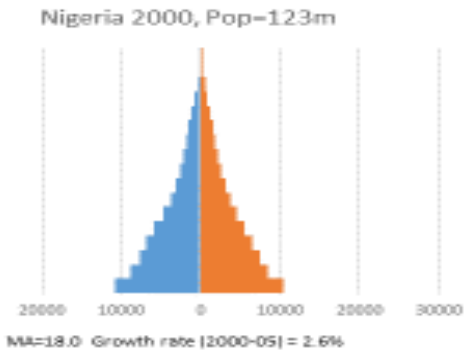
India 2050, Pop=1,620m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
80000
60000
40000
20000
0
20000
40000
60000
80000
MA=36.7 Growth rate (2045-50) = 0.3%

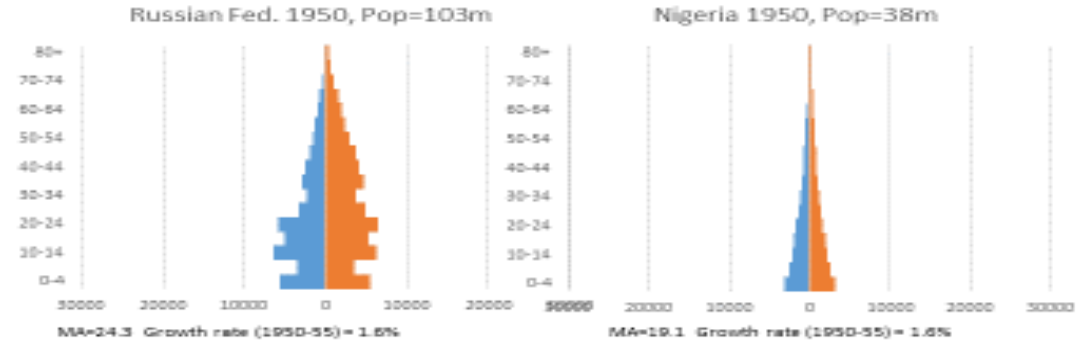

Russian Fed. 1950, Pop=103m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
30000
20000
10000
0
10000
20000
30000
MA=24.3 Growth rate (1950-55) = 1.6%
Nigeria 1950, Pop=38m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
30000
20000
10000
0
10000
20000
30000
MA=19.1 Growth rate (1950-55) = 1.6%

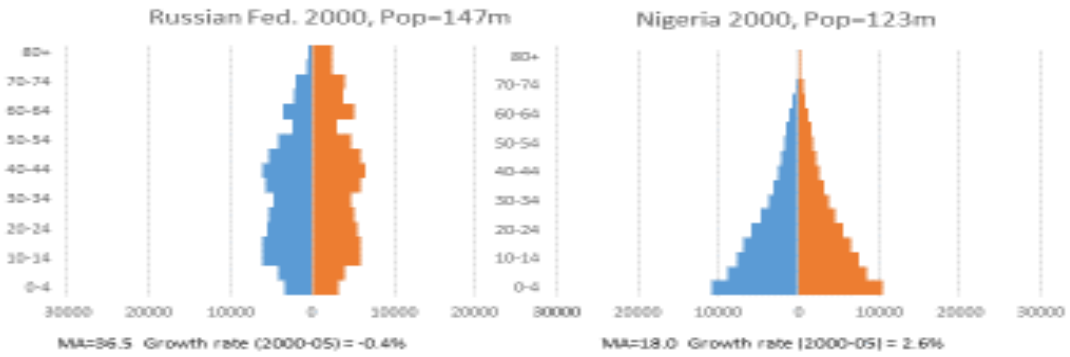

Russian Fed. 1950, Pop=103m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
30000
20000
10000
0
10000
20000
30000
MA=24.3 Growth rate (1950-55) = 1.6%

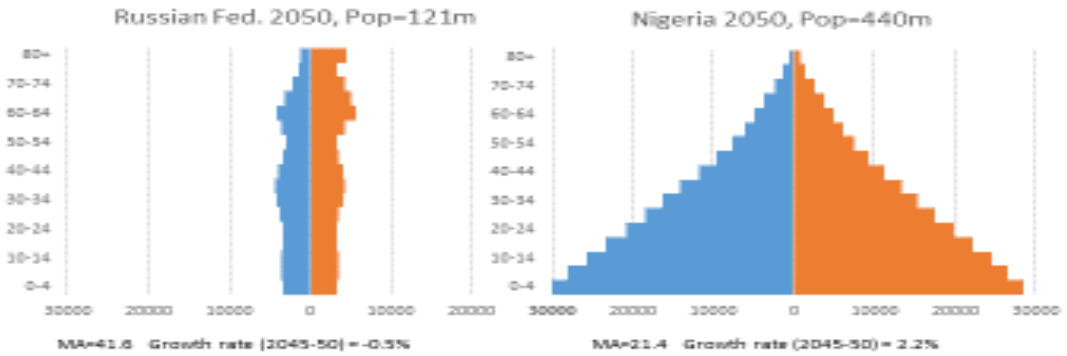

Nigeria 1950, Pop=38m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
20000
10000
0
10000
20000
30000
MA=19.1 Growth rate (1950-55) = 1.6%


Russian Fed. 2000, Pop=147m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
30000
20000
10000
0
10000
20000
30000
MA=36.5 Growth rate (2000-05) = -0.4%

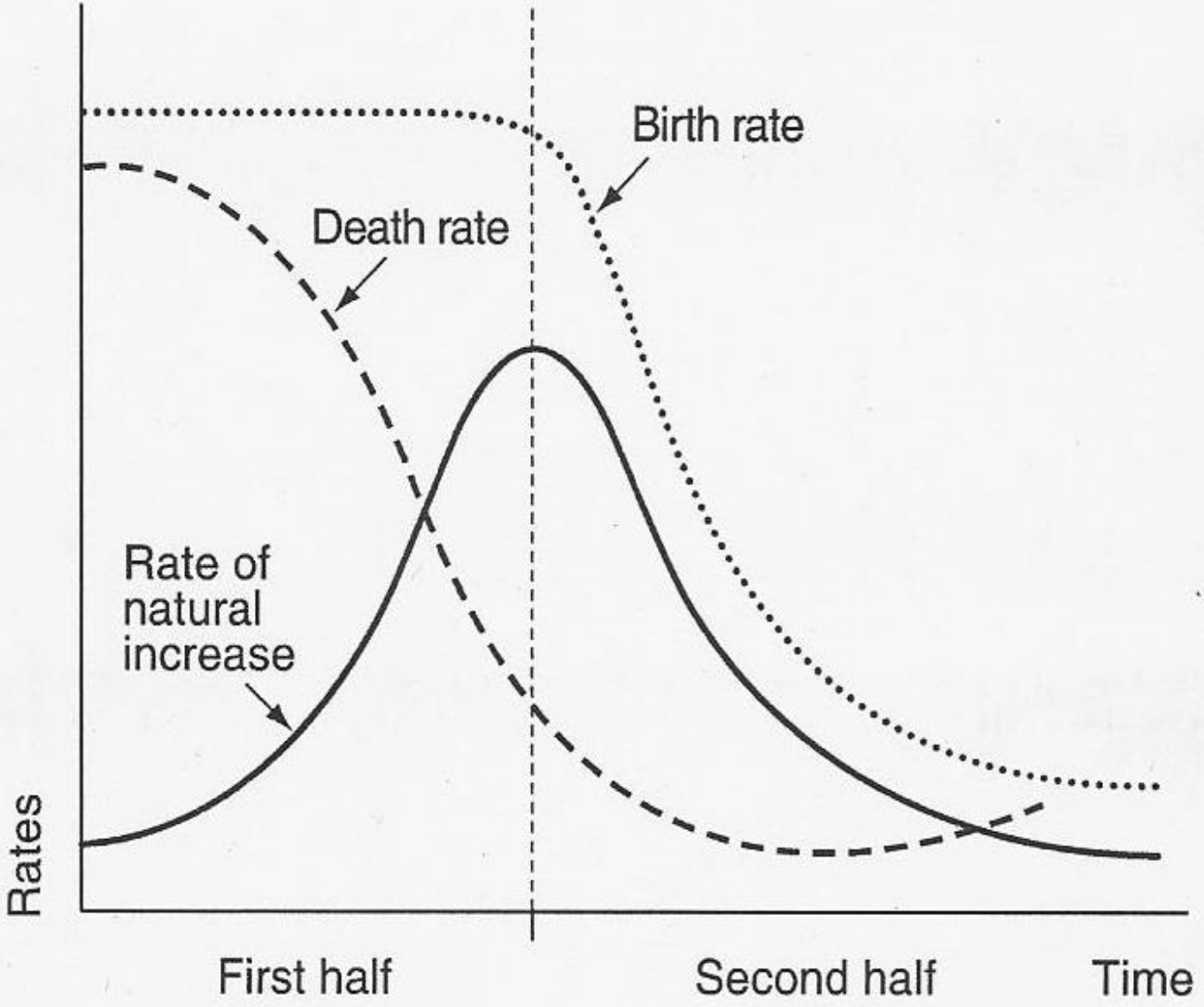

Nigeria 2000, Pop=123m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
20000
10000
0
10000
20000
30000
MA=18.0 Growth rate |2000-05| = 2.6%


Russian Fed. 1950, Pop=103m
Nigeria 1950, Pop=38m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
30000
20000
10000
0
10000
20000
30000
MA=24.3 Growth rate (1950-55) = 1.6%
MA=19.1 Growth rate (1950-55) = 1.6%


Russian Fed. 2000, Pop=147m
Nigeria 2000, Pop=123m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
30000
20000
10000
0
10000
20000
30000
MA=36.5 Growth rate (2000-05) = -0.4%
MA=18.0 Growth rate (2000-05) = 2.6%


Russian Fed. 2050, Pop=121m
Nigeria 2050, Pop=440m
80+
70-74
60-64
50-54
40-44
30-34
20-24
10-14
0-4
30000
20000
10000
0
10000
20000
30000
MA=41.6 Growth rate (2045-50) = -0.5%
MA=21.4 Growth rate (2045-50) = 2.2%

Stylized depiction of the demographic transition

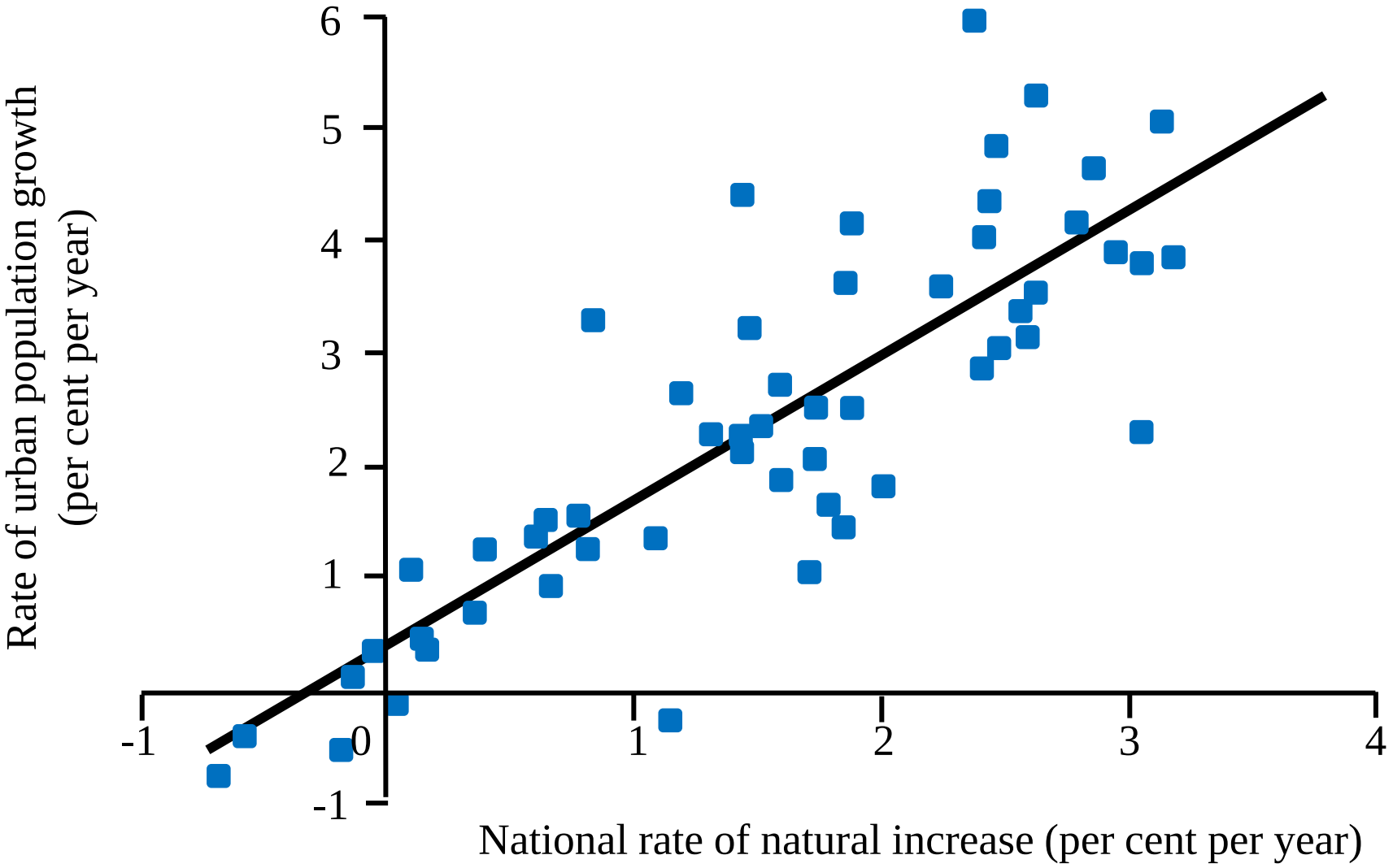


The demographic transition has many implications for development

1. The urban sector
2. The environment
3. Economic implications
4. Marriage and gender relations

1. Urban Growth

The rate of natural increase as a determinant of urban growth, 56 countries 1995-2005



Natural increase as a source of urban growth

‘There is strong evidence that declines in national rates of natural increase tend to be matched **one-for-one** by declines in national rates of urban growth … policies to affect natural increase by providing family planning services would seem to provide the most palatable means of reducing urban growth. Oddly, family planning services are rarely seen as a candidate for slowing urban growth, which probably reflects an artificial … distinction between population growth and population distribution policies’—Preston (1979: 210, emphasis added).

2. The Environment

Population growth since 1950 has undoubtedly been a key factor of :

- The **expansion of the area** under cultivation (e.g. to produce more food)
- **Deforestation** and depletion of other forms of vegetative cover (e.g. grasslands)
- Reductions in **biodiversity**
- **Stress on water resources** (e.g. through greater demand, and increased pollution of water supplies)

Population growth has been a factor in the growth of fossil fuel (coal, oil, natural gas) use, and so informs climate change

Between 1950 and 2013 total annual use of carbon fuels rose from 1,589 to 11,052 million tons oil equivalent (mtoe).

Further, population growth has underlain growth in the release of other greenhouse gases—e.g. nitrous oxide. Today, nitrogen fertilizers provide roughly half of all nutrients in world's harvest.

'Currently at least two billion people are alive because the proteins in their bodies are built with nitrogen that came—via plant and animal foods—from a factory using [the Haber-Bosch process for fertilizer production] … In just one lifetime humanity has indeed developed a profound chemical dependence' —Smil (1997: 63).

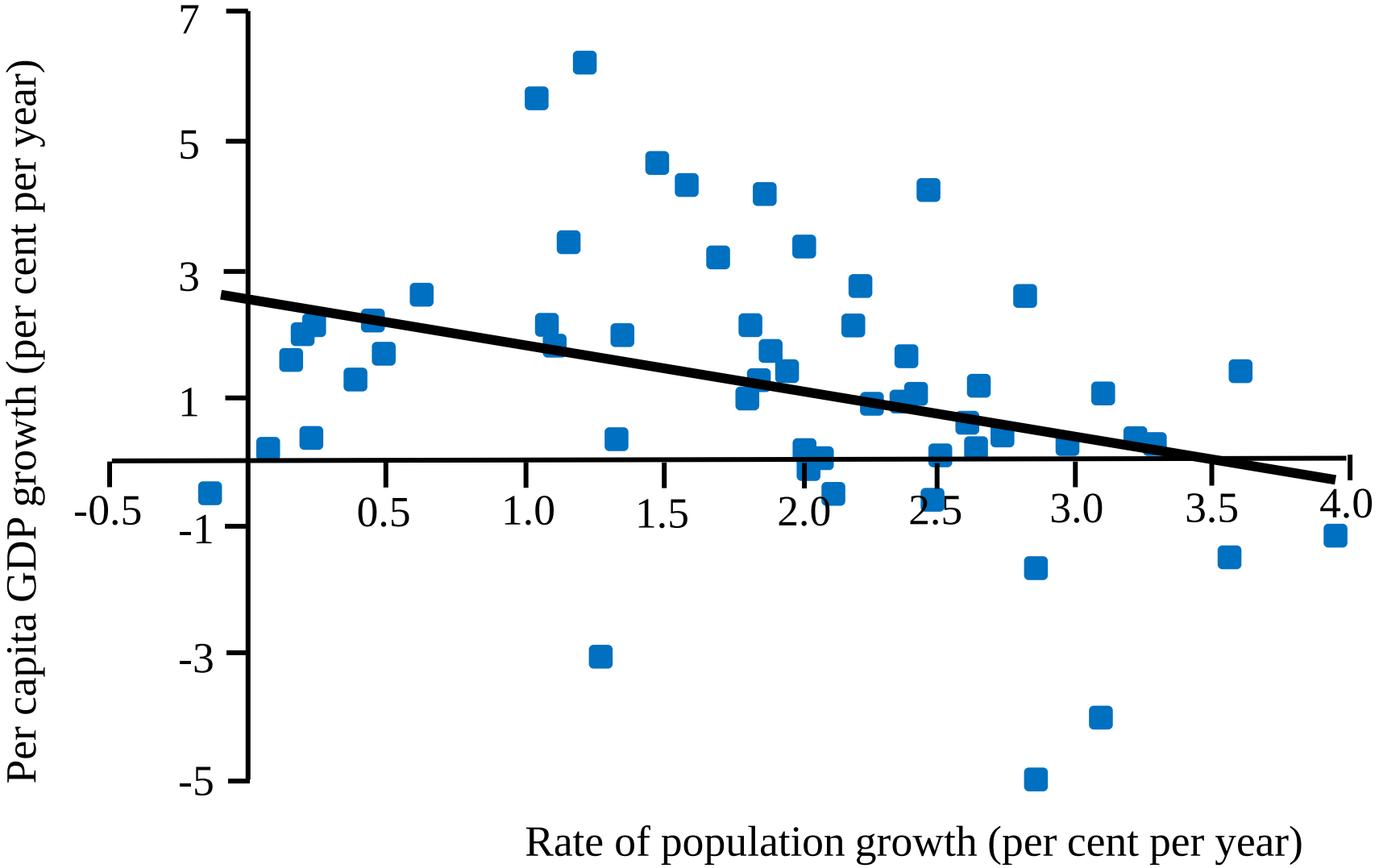
3. Economic Implications

‘[I]n contrast to assessments over the last several decades, rapid population growth is found to have exercised a quantitatively important negative impact on the pace of economic growth in developing countries … **rapid fertility decline is found to make a quantitatively relevant contribution to reducing the incidence and severity of poverty**’

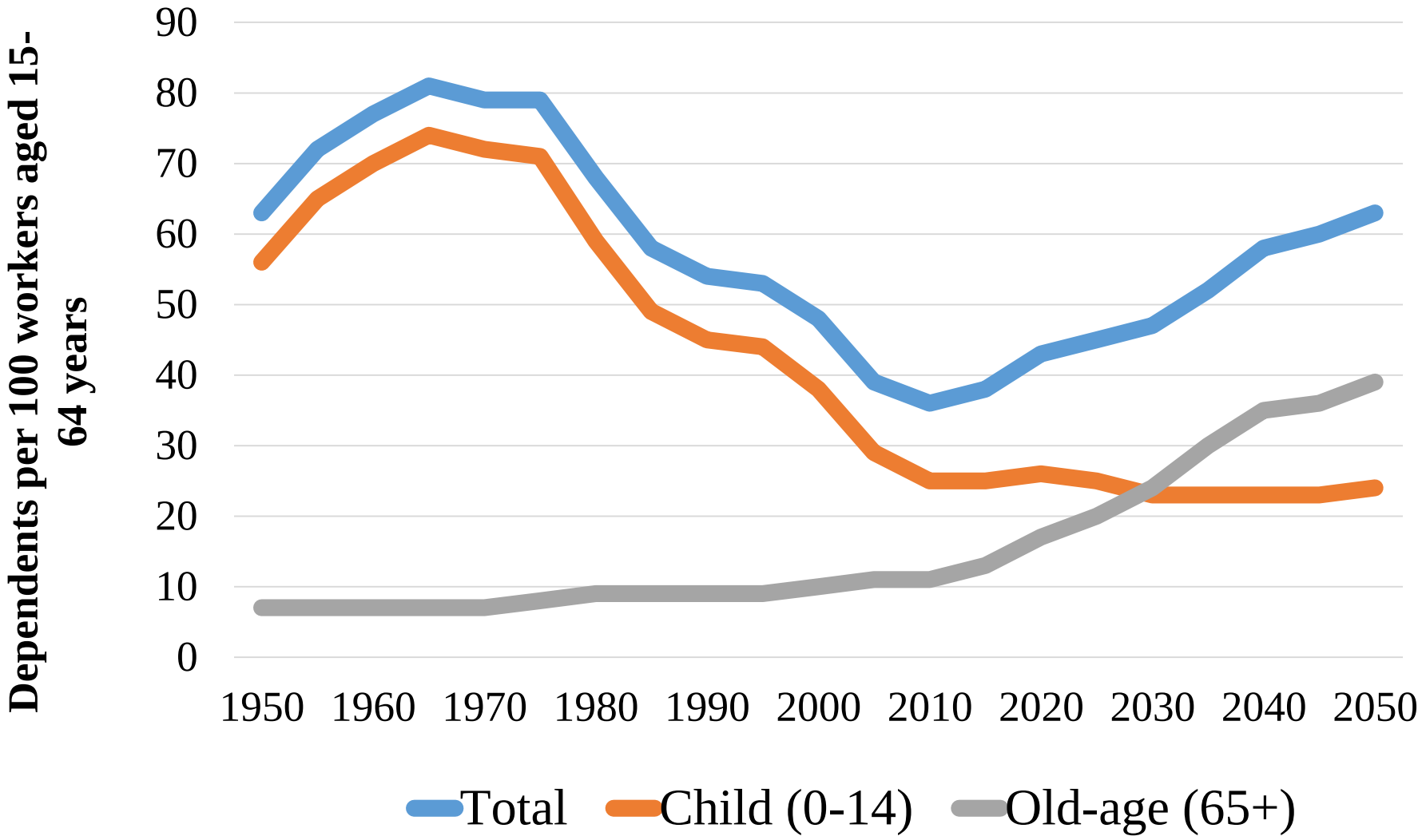
—Birdsall and Sinding (2001: 6, emphasis added)

3. Economic implications

Population growth and economic growth, 56 countries 1995-2005



Dependency ratios for China, 1950-2050



4. Marriage and gender relations

Clearly, the position and treatment of women is extremely poor in many countries. Gender violence is often prevalent. Universal access to reproductive health is far from being a reality. And even in high income countries large gender gaps often remain in both careers and pay.

Nevertheless, in the most demographically advanced countries, there are grounds to believe that women's relative position has gradually improved—at least partly as a result of mortality and fertility decline.

In circumstances of sustained low mortality and low fertility in these countries, marriage has become a somewhat weaker and a more flexible institution—which is probably a good thing—and because of access to means of fertility control, women's lives are no longer so dominated by repeated childbirth and child care.

All countries face challenges as a result of their population dynamics.

Demographic forces often operate in underlying ways.

The demographic transition should stand at the heart of our understanding of development.

Rapid population decline may be as challenging for societies to handle sustainably as rapid population growth.

Tackling the crucial issue of climate change will require major reductions in fossil fuel use in the world's rich countries

Finally, in the world's least developed countries, if we really want to improve the health of children, or raise the status of women, or improve levels of education, or address the problems caused by rapid urban growth, or help conserve the environment, or help make 'poverty history', then there are few better ways of doing these things than making sure that people have access to safe, effective, affordable, and modern means of birth control—as a basic human right.

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