# THE DEMOGRAPHY OF POPULATION AGEING

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An inevitable consequence of the demographic transition and the shift to lower fertility and mortality has been the evolution in the age structure of the world population. Many societies, especially in the more developed regions, have already attained older population age structures than have ever been seen in the past. Many developing countries in the midst of the demographic transition are experiencing rapid shifts in the relative numbers of children, working-age population and older persons.

## DEMOGRAPHIC ASPECTS

The number of persons aged 60 years or older in the world is estimated to be 605 million in 2000. This number is projected to grow to nearly 2 billion by 2050, at which time it will be as large as the population of children (0-14 years). This historic crossover of an increasing share of older persons and a declining share of children will mark the first time that the number of children and older persons are the same.

Persons aged 60 or older currently comprise 10 per cent of the world population (see table 1). The percentage is much higher in the more developed regions (20 per cent) than in the less developed regions (8 per cent), which are at an earlier stage of the demographic transition. It is especially low in the least developed countries (5 per cent). Among individual countries, the most aged are Greece and Italy, where 24 per cent of the population is aged 60 or older in 2000. Many European countries, as well as Japan, have percentages nearly as high. By 2050, the older ages will make up a projected 22 per cent of the world population—33 per cent in the more developed regions, 21 per cent in the less developed regions and 12 per cent in the least developed countries.

**(TABLE 1 HERE)**

In terms of major regions, the majority of the world's older persons (53 per cent) reside in Asia, while Europe has the next largest share, 24 per cent (see table 2 and figure I). Asia's share of the older population will increase to 63 per cent by 2050, while the share of Europe will show the greatest relative decrease of any region, shrinking from 24 per cent to 11 per cent.

*Population Division, United Nations Secretariat.

**(TABLE 2 HERE)**

**(FIGURE I HERE)**

The oldest old, persons aged 80 years or older, currently number 70 million, the majority of whom live in more developed regions. Thirty-three million are estimated to be living in less developed regions. They make up about 1 per cent of the world's population and 3 per cent of the population of the more developed regions. This oldest age group is the fastest growing segment of the older population. By 2050, the number of the oldest old is projected to be five times as large as at present. By that date, the oldest old will be 4 per cent of the total world population, and in the more developed regions, one person out of 11 is projected to be aged 80 or older. In the less developed regions, 3 per cent of the population will be 80 years or older.

It is necessary to look beyond 2050 to see the full consequences for population ageing of ongoing trends towards lower fertility and mortality rates. A range of alternative scenarios presented in the United Nations long-range population projections (United Nations, 1999a) show that future populations will reach a significantly older age structure than the populations of the present, or even of the populations of 2050. Figure II shows projected trends in the proportion of the world's population aged 60 or older through the year 2150, from the medium fertility scenario, which assumes that fertility in all major areas will stabilize at replacement level around 2050, and that mortality rates will continue to improve. By 2150, persons aged 60 or older are projected to number 3.0 billion, nearly one person out of every three alive at that time. Over 1.2 billion people, or one in every 10 persons, will be aged 80 or older. Only 18 per cent of the population will be children aged under 15 years, as compared to 30 per cent at present.

**(FIGURE II HERE)**

*Speed of ageing*

The growth of the older population often receives attention in connection with the developed countries. However, the tempo of ageing is more rapid in the less developed regions than in the more developed regions (see figure III). Because rapid changes in age structure may be more difficult for societies to adjust to than change that is spread over a longer time horizon, the speed of population ageing has important implications for government policies, such as pension schemes, health care and economic growth. Figure IV shows, for selected countries, the dates when the population reached, or is expected to reach, the point when 7, 14 and 21 per cent of the population was aged 65 or older. (Currently, 6.9 per cent of the world's population is aged 65 or older.) Typically, the transition from 7 to 14 per cent took longer for countries that reached the 7 per cent

level at an earlier date. For example, France and Sweden, which reached the 7 per cent point before 1900, took 114 years and 82 years, respectively, to reach 14 per cent. That same transition required only 24 years in Japan, from 1970 to 1994. Several developing countries shown in figure IV will also make a rapid transition from 7 to 14 per cent aged 65 or older. Brazil, Indonesia, the Republic of Korea and Tunisia are projected to make this transition in a time-span of under 25 years, and the two most populous countries, China and India, may require only 25 and 28 years, respectively.

**(FIGURE III HERE)**

In many cases, it will take substantially less time for the transition from 14 to 21 per cent aged 65 years or older than it took to move from 7 to 14 per cent (see figure IV). Although no country has yet reached the point where 21 per cent of the population is aged 65 or older, some countries, including Italy and Japan, are expected to reach that point before 2015; in Japan, the transition from 14 to 21 per cent will have taken only 16 years, and in Italy, 23 years. At a later date, Canada and the United States of America are also expected to make a rapid transition from 14 to 21 per cent aged 65 or older as the large "baby boom" cohorts enter the higher ages. Thus, in the near future, some societies will be faced not only with older populations than have ever existed at the national level, but also with populations that are ageing at an extremely rapid pace.

**(FIGURE IV HERE)**

*Ageing and gender*

Population ageing is, in basic demographic respects, not "gender-neutral". The evolution to an older age structure changes the balance in numbers of men and women in the whole population. Men's higher mortality over the life course means that women typically outnumber men at older ages, and the difference is quite large among the oldest old (see table 3). At ages 60 or older, there were an estimated 81 men for every 100 women globally in 2000, and at ages 80 or older there were only 53 men for every 100 women. The sex ratios of older age groups are lower in the more developed regions than in the less developed regions, since there are larger differences in life expectancy between the sexes in the more developed regions. In addition, the sex ratio in the oldest age groups in the more developed regions retains the effect of the heavy loss of males in some countries during the Second World War.

**(TABLE 3 HERE)**

Given the age patterns of the sex ratio, the rapid growth of the elderly population and the increase in the proportion in older age groups imply a decrease in the sex ratio for the total population and a greater increase

in the number of older women than of older men. Projected increases between 2000 and 2050 in the number of persons aged 60 or older are 636 million for men and 729 million for women in the world as a whole. Projected increases during the same period in the number of persons aged 80 or older are 116 million for men and 185 million for women.

Concomitant with dramatic improvements in average lifespan has been the widening differential over time between male and female longevity. By 1995-2000, the female advantage in life expectancy at birth has grown to almost eight years in more developed regions and three years in less developed regions. The advantage, however, diminishes during the life course and by age 60, the male-female differential has narrowed to four years in more developed regions and to only two years in less developed regions. At current mortality rates (for 1995-2000), almost 40 per cent of girls and about one quarter of boys born can expect to survive to the "oldest old" ages, 80 years or older. While the increased likelihood of surviving to older ages is obviously due to mortality declines at younger ages, recent decades have also seen significant mortality improvements among the older population, including the oldest old, and these trends so far have been more beneficial to women than to men (Kannisto, 1994).

At older ages, women are less likely to be married and more likely to be widowed than are men, not only because they survive on average to higher ages, but also because most women marry men several years older than themselves. While more than three quarters (79 per cent) of older men are married, on a global basis, less than one half (43 per cent) of older women are married (United Nations, 1999b). The longer-term effect of gender differences in marriage age on later widowhood is only one of many ways in which demographic, as well as economic and social circumstances in early life have diverging ramifications for men and women in old age.

*Demographic causes of population ageing*

The process of population ageing is determined primarily by trends in fertility rates and secondarily by mortality rates. Any population with a long history of high fertility has a "young" age structure, similar in its general features to the present age structure for the group of least developed countries (see figure V). The average age of the population starts to rise when fertility rates decline. For the period 1995-2000, 61 countries in the world, representing 44 per cent of the world's population, are at or below replacement fertility. By 2015, the world's population is projected to reach 7.2 billion, of which about two thirds will be living in countries at or below replacement fertility (United Nations, 1999c). The impact of mortality decline is more variable, depending on whether the decline in mortality operates mainly at younger or at older ages. In fact, the first stages of mortality decline have usually particularly benefited infants and children, and have often served to make the population younger. However, changes in mortality may assume a greater importance for

population ageing later in the demographic transition. In countries where mortality rates at young ages are already low, further declines have tended to affect mainly the adult and older ages, and have contributed to population ageing. For example, Caselli and Vallin (1990) have demonstrated the growing impact of mortality change in population projections of France and Italy. They concluded that even if Italian fertility remained at a very low level of 1.4 children per woman through the year 2040, more than half the increase in the proportion of the population aged 60 or older would be due to mortality change, and less than half to the earlier fertility trends.

**(FIGURE V HERE)**

*Trends in dependency ratios*

Demographic dependency ratios are used as approximate indicators of the relative sizes of the non-working-age and working-age populations. The youth-dependency ratio (the number of children per 100 persons of labour force age, ages 15-64 years) and the elderly-dependency ratio (the number aged 65 years or older per 100 persons of labour force age) indicate the dependency burden on workers and how the type of dependency shifts from children to older persons during the demographic transition. The potential economic implications of falling or rising burdens of demographic dependency have been an area of active research.

Since 1970, the youth-dependency ratio has been declining in all regions, while the over-65 dependency ratio is rising (see table 4). Trends for the total ratio in different countries and regions depend upon the relative size and speed of these countervailing trends in the older and younger components. In general, the total dependency burden declined between 1970 and 2000. In the more developed regions, the total dependency ratio decreased over that period from 56 to 48 dependent-aged persons per 100 aged 15 to 64. The ratio will increase between the present and 2025 and is projected to rise further, to 70, by 2050. In the less developed regions, the overall dependency ratio in 1970 was 84, much higher than in the more developed regions, but it decreased rapidly to 60 by 2000, is projected to decline further to 50 by 2025 and then to increase slightly between 2025 and 2050. The impact of demographic ageing is clearly visible in the old-age dependency ratio, which is increasing in both more and less developed regions during the period from 1970 to 2050. Between 2000 and 2050, the old-age dependency ratio will double in more developed regions and almost triple in less developed regions.

**(TABLE 4 HERE)**

The amount and pace of change in demographic dependency ratios varies greatly between countries. Large swings in dependency ratios are typically initiated or accentuated by rapid fertility declines, but those

effects take many years to play out. Four examples are shown in figure VI to illustrate a range of situations and trends:

Argentina has experienced a gradual fertility decline, with relatively minor fluctuations over a long period. It is projected to experience only minor changes in the total dependency ratio, which will remain near 60 over the entire period from 1970 to 2050.

In Italy, the total fertility rate plummeted after the mid-1970s to reach the unprecedentedly low level of 1.2 by the early 1990s. The total dependency ratio initially declined, but increases in the over-65 dependency ratio will dominate the trend into the future, and will produce an especially rapid rise in demographic dependency after 2020.

The Republic of Korea experienced a rapid fertility decline after 1970, and the total dependency ratio fell to an unusually low level of 39 by 2000. The overall ratio will not begin to rise appreciably until after 2015, but it will then increase rapidly.

Kenya shows an extremely high child-dependency ratio, with a total dependency ratio of 115 in 1980. Kenya had one of the highest levels of fertility in the world, estimated at 8.1 children per woman during the period from 1960 to 1980, before beginning a rapid fertility decline, which is projected to continue. By 2000, Kenya's under-15 and over-65 ratios were similar to those seen in the Republic of Korea 30 years earlier.

**(FIGURE VI HERE)**

*Urbanization*

Consistent with the global trend of urbanization, the older population is becoming more concentrated in urban areas. By 2000, the majority of the world's older persons (51 per cent) will live in urban areas; by 2025, this is expected to climb to 62 per cent of older persons (United Nations, 1993). These figures, however, mask the large divergence between more and less developed regions. In the more developed regions, 74 per cent of older persons are urban dwellers, while in the less developed regions, which remain predominantly rural, slightly more than one third (37 per cent) of the elderly reside in urban areas. Despite the increasing urbanization of the older population, rural areas remain disproportionately older than urban areas in many countries as a result of migration of young persons to urban areas and the return migration of older persons to rural areas (Martin and Kinsella, 1994).

## CONCLUSIONS

There can be little doubt that changes in age distribution have complex social and economic implications at the societal and individual levels. An excess supply of workers could for instance turn into an acute shortage of new entrants within a few years. Likewise, the departure of older workers from the labour force is a source of serious pressure on national economies through its impact on pension schemes. An important issue is the question of how best to allocate limited resources among public sectors. Accordingly, planning may have to reflect greater sensitivity to expected demographic changes. This is especially important in the light of an increasingly competitive and integrated international economic environment, as well as a re-examination of the limitations of the welfare state. Conventional wisdom is that if change is slow, countries can more easily adapt. As the experience of developed countries has shown, despite an ageing process that has occurred over many years, adjustment to the challenges posed by population ageing has not been smooth. Given that large shifts in age structure are being compressed into a relatively short period in developing countries, these countries will have less time than the developed countries to adapt to the problems posed by the changing age structure.

On the individual level, the goal is to enable older persons to maintain their dignity, self-esteem and physical and mental well-being in order to facilitate their continued participation in society and recognize their valuable contribution to their families and communities. The challenge for countries and communities is to provide conditions that promote quality of life and enhance the ability of older persons to work and live independently as long as possible.

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TABLE 1. ESTIMATED AND PROJECTED PERCENTAGE OF THE POPULATION IN SELECTED AGE GROUPS, BY REGION

| *Region* | *1970* | *2000* | *2025* | *2050* |
|---|---|---|---|---|
| | | *Children: under age 15* | | |
| World total | 37 | 30 | 23 | 20 |
| More developed regions | 26 | 18 | 16 | 15 |
| Less developed regions | 42 | 33 | 25 | 20 |
| Least developed countries | 44 | 42 | 35 | 24 |
| Africa | 45 | 42 | 35 | 24 |
| Asia | 40 | 30 | 22 | 19 |
| Europe | 25 | 17 | 15 | 14 |
| Latin America and the Caribbean | 42 | 32 | 24 | 20 |
| Northern America | 29 | 21 | 18 | 17 |
| Oceania | 32 | 25 | 21 | 19 |
| | | *Youth: ages 15-24* | | |
| World total | 18 | 18 | 15 | 13 |
| More developed regions | 17 | 14 | 11 | 11 |
| Less developed regions | 18 | 19 | 16 | 14 |
| Least developed countries | 18 | 20 | 20 | 17 |
| Africa | 18 | 20 | 20 | 17 |
| Asia | 18 | 18 | 15 | 13 |
| Europe | 16 | 14 | 10 | 10 |
| Latin America and the Caribbean | 19 | 20 | 16 | 13 |
| Northern America | 17 | 13 | 12 | 12 |
| Oceania | 18 | 15 | 14 | 13 |
| | | *Older persons: ages 60 or over* | | |
| World total | 8 | 10 | 15 | 22 |
| More developed regions | 15 | 20 | 28 | 33 |
| Less developed regions | 6 | 8 | 13 | 21 |
| Least developed countries | 5 | 5 | 6 | 12 |
| Africa | 5 | 5 | 6 | 12 |
| Asia | 6 | 9 | 15 | 24 |
| Europe | 15 | 20 | 28 | 35 |
| Latin America and the Caribbean | 6 | 8 | 14 | 22 |
| Northern America | 14 | 16 | 26 | 28 |
| Oceania | 11 | 13 | 20 | 24 |
| | | *Oldest old: ages 80 or over* | | |
| World total | 1 | 1 | 2 | 4 |
| More developed regions | 2 | 3 | 5 | 9 |
| Less developed regions | 0.4 | 1 | 1 | 3 |
| Least developed countries | 0.3 | 0.3 | 1 | 1 |
| Africa | 0.3 | 0.4 | 1 | 1 |
| Asia | 0.4 | 1 | 2 | 4 |
| Europe | 2 | 3 | 5 | 9 |
| Latin America and the Caribbean | 1 | 1 | 2 | 4 |
| Northern America | 2 | 3 | 4 | 8 |
| Oceania | 1 | 2 | 3 | 6 |

*Source*: *The Sex and Age Distribution of the World Populations: the 1998 Revision, volume II: Sex and Age* (United Nations publication, Sales No. E.99.XIII.8), medium variant projections.

TABLE 2. ESTIMATED AND PROJECTED REGIONAL DISTRIBUTION OF THE POPULATION AGED UNDER 15 YEARS AND THE POPULATION AGED 60 YEARS OR OVER - 1970, 2000 AND 2050

*(Percentage)*

| *Region* | *Under age 15* | | | *Aged 60 or over* | | |
|---|---|---|---|---|---|---|
| | *1970* | *2000* | *2050* | *1970* | *2000* | *2050* |
| World total | 100 | 100 | 100 | 100 | 100 | 100 |
| More developed regions | 19 | 12 | 10 | 47 | 38 | 19 |
| Less developed regions | 81 | 88 | 90 | 53 | 62 | 81 |
| Least developed countries | 10 | 15 | 20 | 5 | 5 | 9 |
| Africa | 12 | 19 | 24 | 6 | 6 | 11 |
| Asia | 63 | 61 | 57 | 45 | 53 | 63 |
| Eastern Asia | 27 | 20 | 15 | 23 | 27 | 26 |
| China | 24 | 18 | 14 | 18 | 21 | 22 |
| South-eastern Asia | 9 | 9 | 9 | 5 | 6 | 9 |
| South Central Asia | 24 | 29 | 28 | 15 | 17 | 25 |
| India | 16 | 19 | 17 | 11 | 13 | 16 |
| Western Asia | 3 | 4 | 5 | 2 | 2 | 3 |
| Europe | 12 | 7 | 5 | 33 | 24 | 11 |
| Latin America and the Caribbean | 9 | 9 | 9 | 6 | 7 | 9 |
| Northern America | 5 | 4 | 4 | 10 | 8 | 6 |
| Oceania | 0.4 | 0.4 | 0.5 | 1 | 1 | 1 |

*Source*: *The Sex and Age Distribution of the World Populations: the 1998 Revision, volume II: Sex and Age* (United Nations publication, Sales No. E.99.XIII.8), medium variant projections.

TABLE 3. SEX RATIOS BY AGE IN THE MORE AND LESS DEVELOPED REGIONS, 2000
(*Men per 100 women*)

| *Age* | *World* | *More developed regions* | *Less developed regions* |
|---|---|---|---|
| | *For broad age groups* | | |
| Total | 101 | 95 | 103 |
| <15 | 106 | 105 | 106 |
| 15-59 | 103 | 101 | 104 |
| 60+ | 81 | 71 | 88 |
| 80+ | 53 | 44 | 64 |
| | *For 5-year groups, ages 60 or over* | | |
| 60-64 | 94 | 87 | 97 |
| 65-69 | 89 | 82 | 93 |
| 70-74 | 81 | 72 | 86 |
| 75-79 | 69 | 59 | 78 |
| 80-84 | 60 | 51 | 69 |
| 85-89 | 48 | 41 | 59 |
| 90-94 | 36 | 32 | 46 |
| 95-99 | 27 | 23 | 37 |
| 100+ | 25 | 19 | 38 |

*Source: The Sex and Age Distribution of the World Populations: the 1998 Revision, volume II: Sex and Age* (United Nations publication, Sales No. E.99.XIII.8).

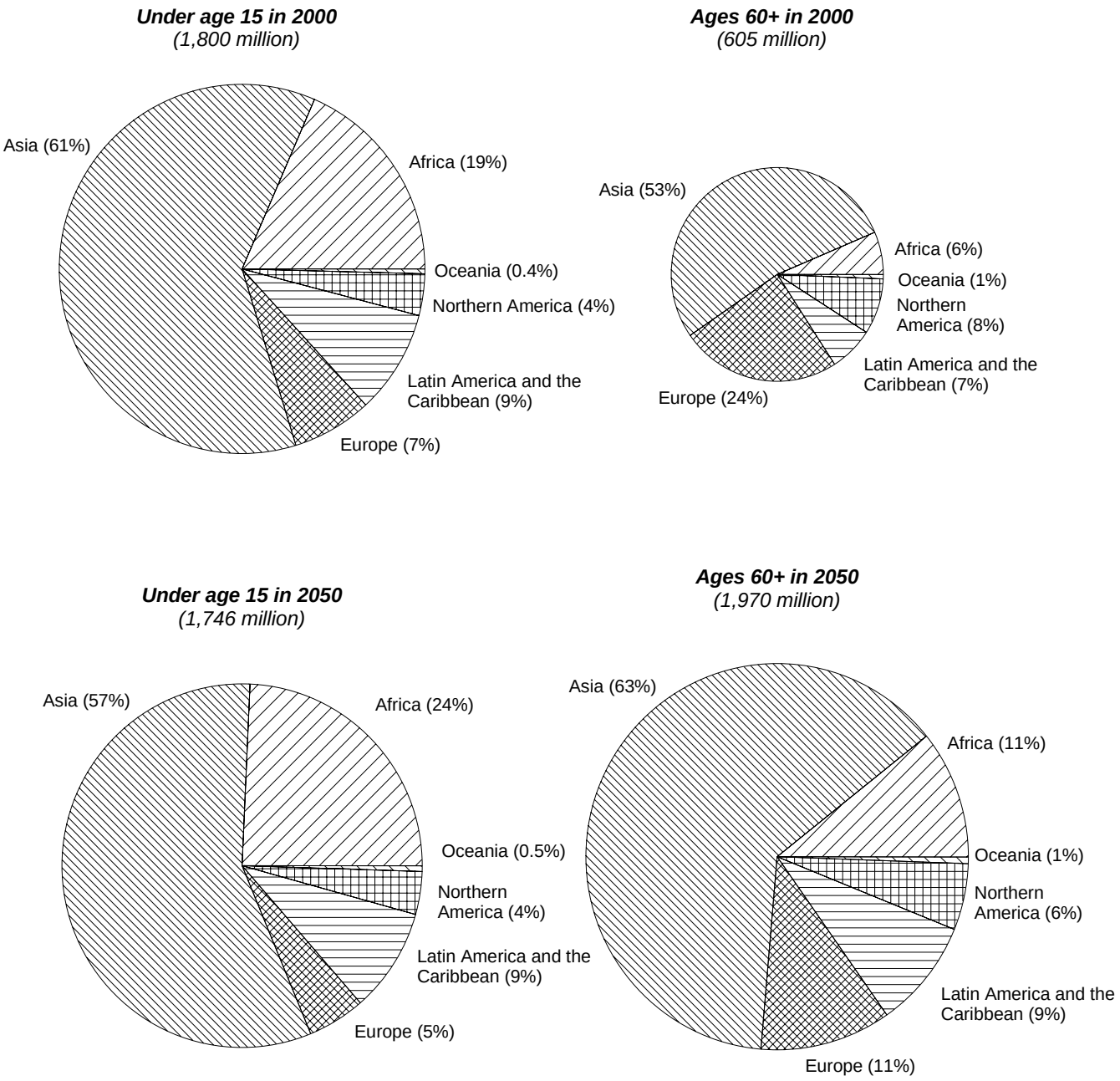
TABLE 4. TRENDS IN AGE-DEPENDENCY RATIOS, BY REGION - 1970 TO 2050
*(Percentage)*

| *Region* | *1970* | *2000* | *2025* | *2050* |
|---|---|---|---|---|
| | *Dependency ratio: total* | | | |
| World total | 75 | 58 | 51 | 56 |
| More developed regions | 56 | 48 | 58 | 70 |
| Less developed regions | 84 | 60 | 50 | 54 |
| Least developed countries | 90 | 82 | 63 | 47 |
| Africa | 92 | 84 | 63 | 47 |
| Asia | 80 | 56 | 48 | 57 |
| Europe | 56 | 48 | 56 | 72 |
| Latin America and the Caribbean | 87 | 59 | 50 | 58 |
| Northern America | 62 | 51 | 59 | 64 |
| Oceania | 65 | 54 | 56 | 60 |
| | *Under age 15* | | | |
| World total | 66 | 47 | 36 | 31 |
| More developed regions | 41 | 27 | 25 | 26 |
| Less developed regions | 77 | 52 | 37 | 31 |
| Least developed countries | 84 | 77 | 56 | 35 |
| Africa | 86 | 78 | 56 | 35 |
| Asia | 73 | 47 | 33 | 30 |
| Europe | 39 | 26 | 23 | 25 |
| Latin America and the Caribbean | 79 | 50 | 35 | 32 |
| Northern America | 46 | 32 | 29 | 28 |
| Oceania | 53 | 39 | 33 | 30 |
| | *Ages 65 or over* | | | |
| World total | 10 | 11 | 16 | 26 |
| More developed regions | 15 | 21 | 33 | 44 |
| Less developed regions | 7 | 8 | 13 | 23 |
| Least developed countries | 6 | 6 | 6 | 12 |
| Africa | 6 | 6 | 6 | 12 |
| Asia | 7 | 9 | 15 | 27 |
| Europe | 16 | 22 | 33 | 47 |
| Latin America and the Caribbean | 8 | 9 | 14 | 27 |
| Northern America | 16 | 19 | 30 | 36 |
| Oceania | 12 | 15 | 23 | 30 |

*Note*: The ratios show the ratio of the numbers of persons aged under 15 years and over 65 years to the number aged 15 to 64 years, expressed as a percentage.

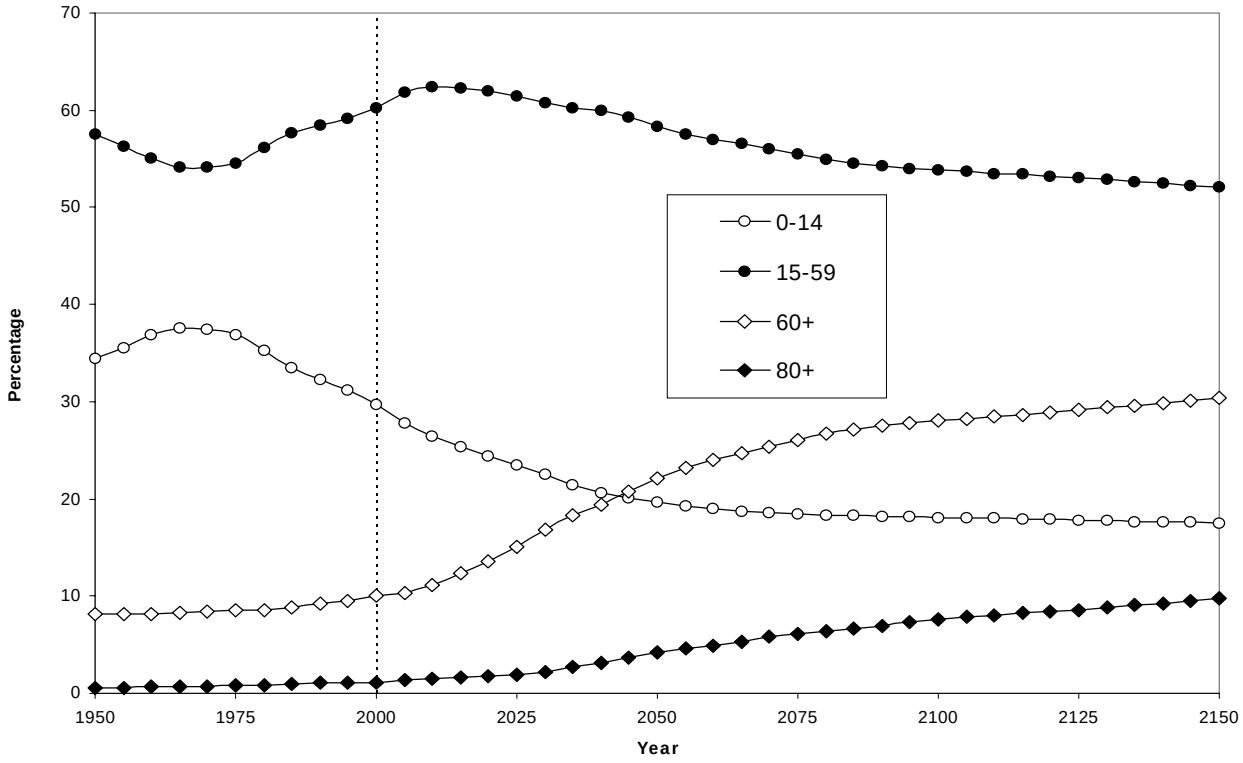
*Source*: *The Sex and Age Distribution of the World Populations: the 1998 Revision, volume II: Sex and Age* (United Nations publication, Sales No. E.99.XIII.8), medium variant projections.

**Figure I. Geographic distribution of the population aged under 15 and 60 or over, 2000 and 2050**



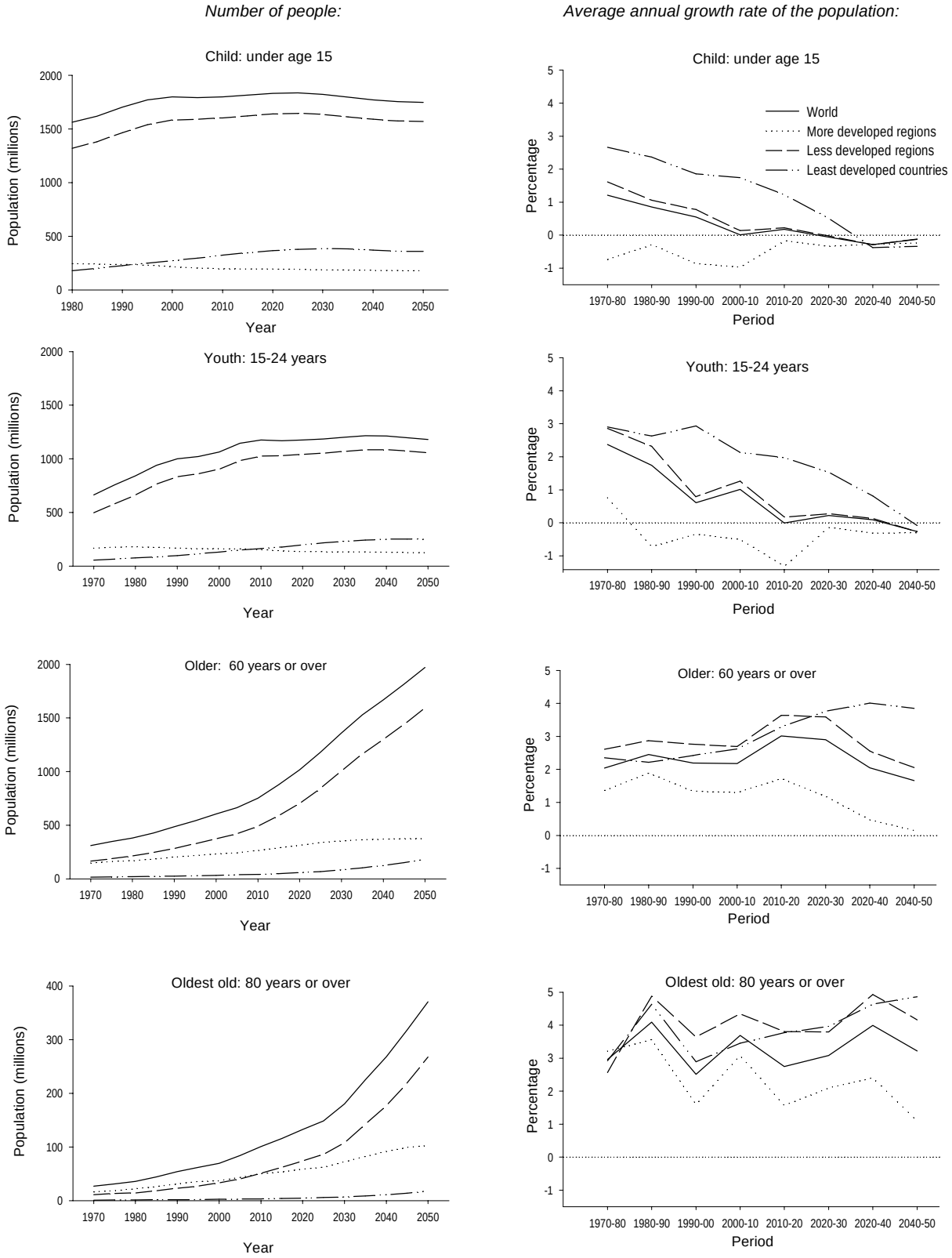

*Source: The Sex and Age Distribution of the World Populations: the 1998 Revision, volume II: Sex and Age (*United Nations publication, Sales No. E.99.XIII.8), medium variant projections.

**Figure II. Percentage of world population by age group, medium scenario, 1950-2150**



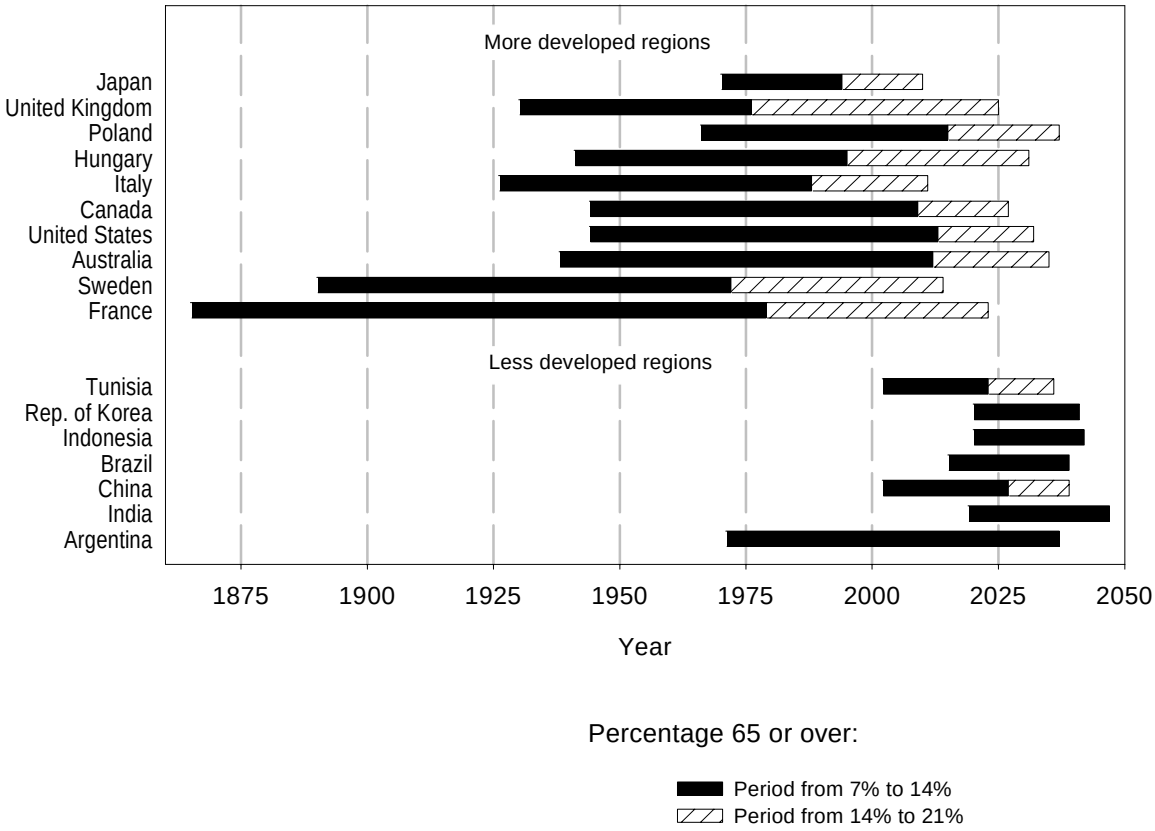

*Source:* Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, Long-range world population projections, based on the 1998 revision (ESA/P/WP.153), 1999**.**

**Figure III. Growth in population size and age-specific annual growth rates, for the child, youth and older populations, 1970-2050**




*Source: The Sex and Age Distribution of the World Populations: the 1998 Revision, volume II: Sex and Age* (United Nations publication, Sales No. E.99.XIII.8), medium variant projections.

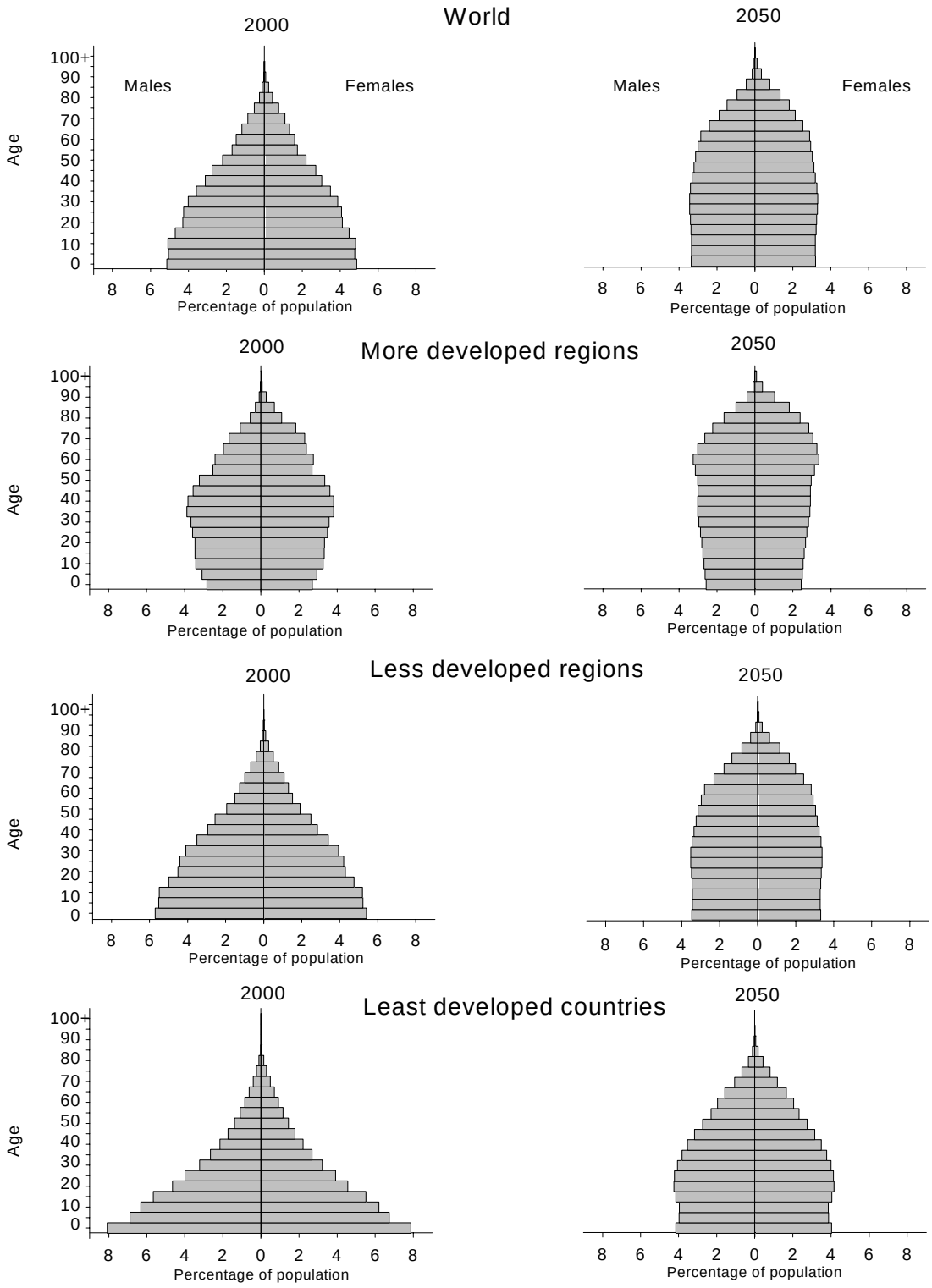
**Figure IV. Time when the percentage of the population aged 65 or over reached or will reach 7, 14 and 21 per cent: selected countries**




*Note*: For countries where the percentage aged over 65 years will reach 21 per cent after 2050, only the period between attainment of the 7 and 14 per cent points is shown.

*Sources: The Sex and Age Distribution of the World Populations: the 1998 Revision, volume II: Sex and Age* (United Nations publication, Sales No. E.99.XIII.8); United States Bureau of the Census, *An Aging World II*, International Population Reports, P95/92-3 (Washington, D.C., Government Printing Office, 1992).

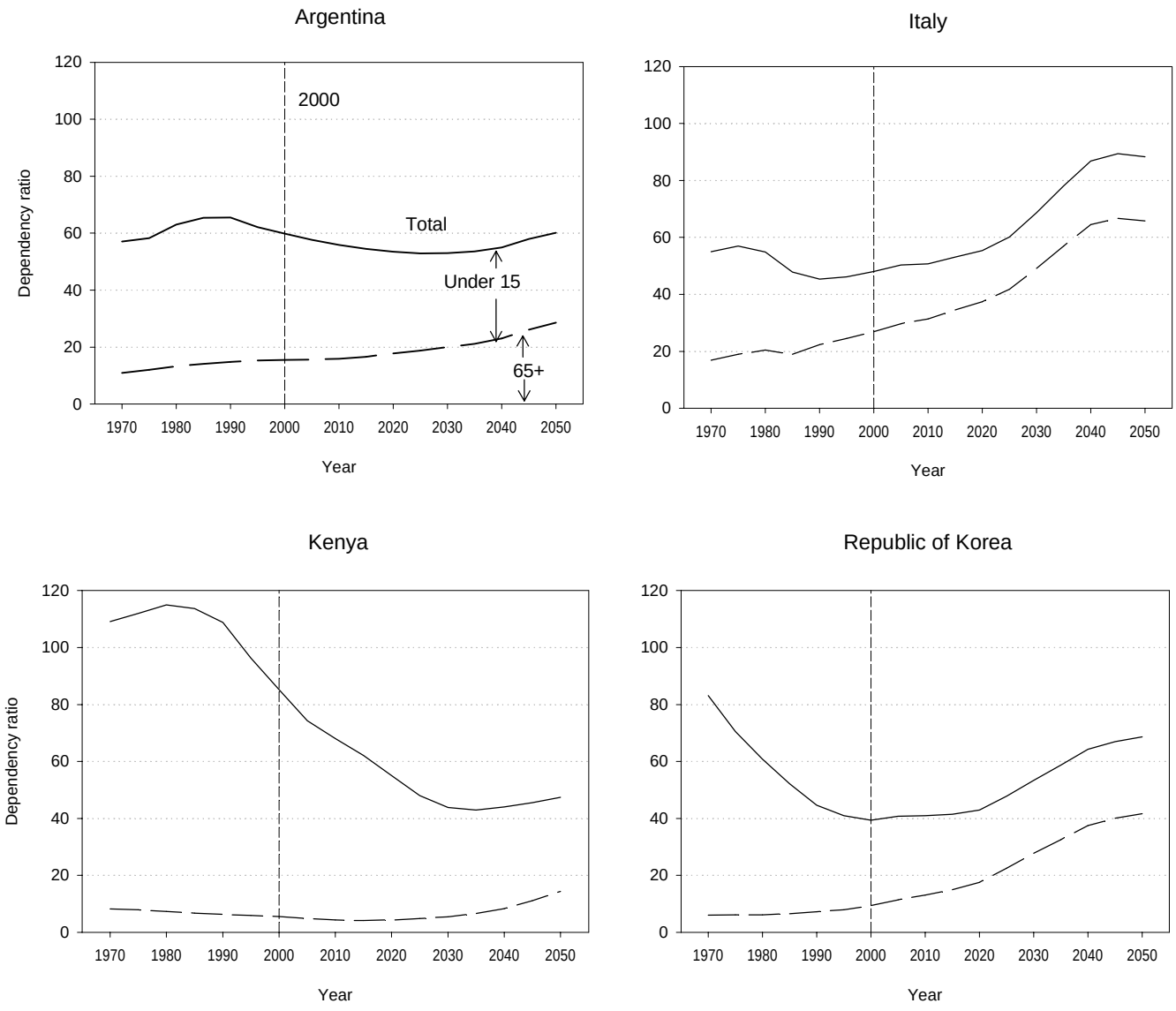
**Figure V. Population pyramids: age and sex distribution, 2000 and 2050**




*Source: The Sex and Age Distribution of the World Populations: the 1998 Revision, volume II: Sex and Age* (United Nations publication, Sales No. E.99.XIII.8), medium variant projections.

**Figure VI. Estimated and projected trends in age-dependency ratios in selected countries**

*(Persons aged under 15 or over 65 years per 100 persons aged 15-64 years)*




*Source: The Sex and Age Distribution of the World Populations: the 1998 Revision, Volume II: Sex and Age (*United Nations publication, Sales No. E.99.XIII.8), medium variant projections.