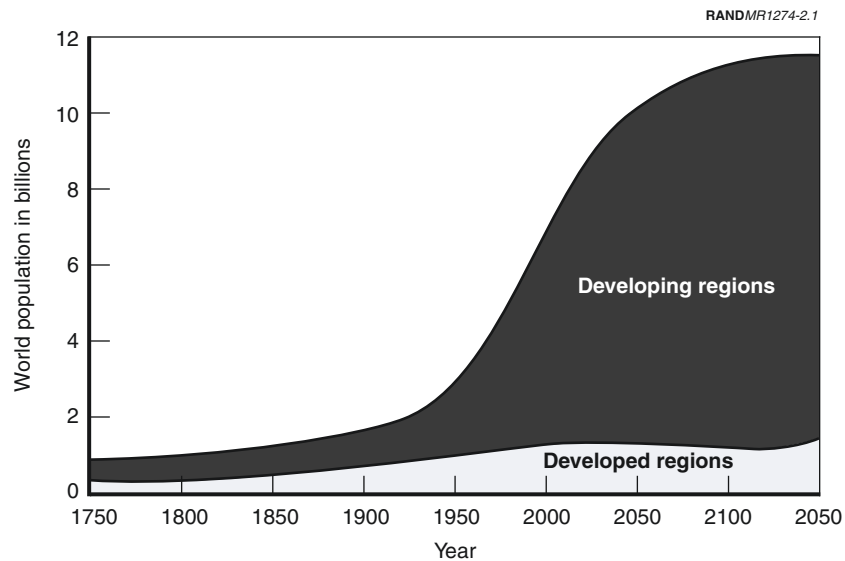

**DEMOGRAPHIC TRANSITIONS AND THE
“DEMOGRAPHIC DIVIDEND”**

This chapter examines the “demographic transition” that all countries experience as social and economic development progresses, discusses the mechanisms by which its impacts are felt, and highlights the opportunity for economic growth—the “demographic dividend”—that this transition offers to developing nations.

**THE DEMOGRAPHIC TRANSITION:
DECLINING MORTALITY AND FERTILITY**

In much of the developing world, a demographic transition is under way, accelerating with the declines in mortality that began near the end of World War II. Improvements in medicine and public health—for instance, the introduction of antibiotics such as penicillin; treatments for diseases such as tuberculosis and diarrhea; and the use of DDT, which helps control malaria—have contained or eradicated diseases that once killed millions of people (Bloom, River Path Associates, and Fang, 2000). These advances were accompanied by improved sanitation, better nutrition, and the wider practice of healthier behaviors. All this gradually led to greater life expectancies, by as much as 20 years in some countries, and naturally to population growth, especially in developing regions (see Figures 2.1 and 2.2). But despite higher life expectancies, these countries had populations that

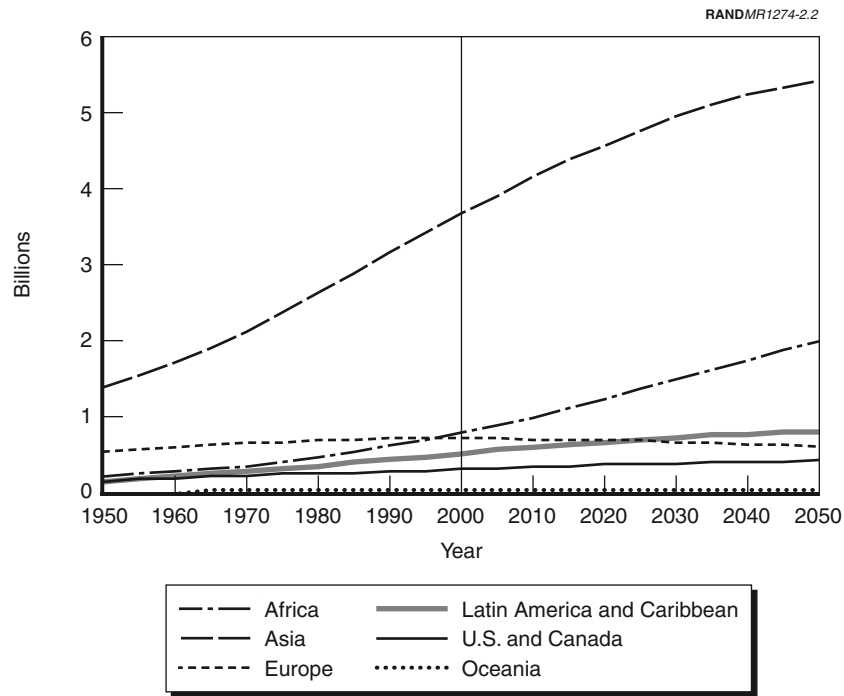
were, on average growing *younger*.¹ This is because mortality declines were not evenly distributed across the population. Infectious diseases are particularly ruthless killers of the young, so their containment had the most powerful impact on the mortality of infants and children, which fell earlier and more quickly than mortality at other ages. (Figure 2.3 shows the decline in infant mortality rates over time, and highlights the difference between more- and less-developed countries.) The larger surviving youth cohorts served to drive down the average age of populations.



SOURCE: Population Reference Bureau, *Human Population: Fundamentals of Growth, Population Growth, and Distribution*, 2001. Available at http://www.prb.org/Content/NavigationMenu/PRB/Educators/Human_Population/Population_Growth/Population_Growth.htm.

Figure 2.1—World Population, 1750–2150

¹From 1950 to 1960, the median age decreased in all regions and subregions of Africa, Asia, and Latin America. This time period captures the early stages of the demographic transition in most of the developing world. See United Nations (2001).

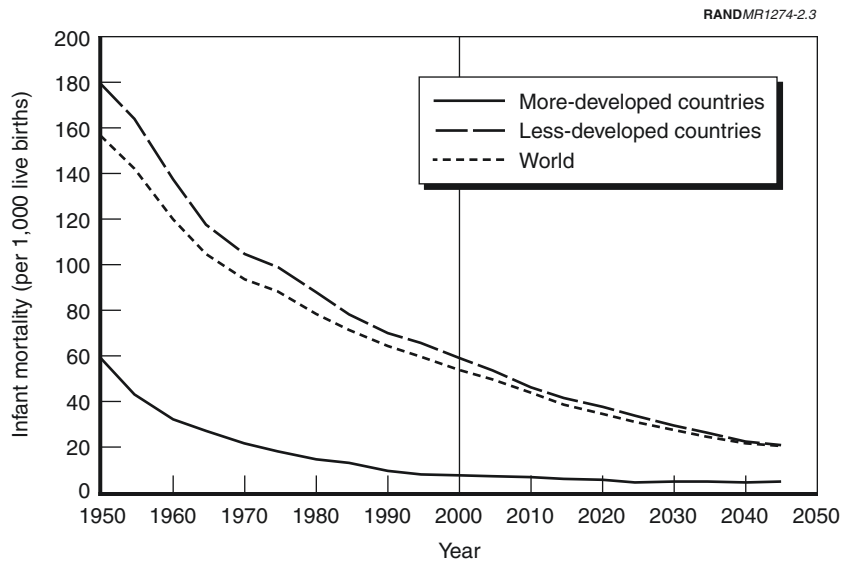


SOURCE: United Nations, “World Population Prospects: The 2000 Revision,” CD-ROM, 2001.

NOTE: Post-2000 data are UN projections.

Figure 2.2—Population by Region, 1950–2050

The mortality decline, which began the demographic transition, has been succeeded by equally dramatic reductions in fertility, especially in less-developed countries (see Figure 2.4). Fertility decisions seem to respond strongly to changes in child mortality as parents realize that if fewer children are likely to die in childhood, they can give birth to fewer children to attain their desired number of offspring. This desire to rein in fertility is reflected in trends in the use of contraceptives. Worldwide, more than half of all couples now use contraception, compared with 10 percent in the 1960s (Department for International Development, 1997). In Bangladesh, for example, the



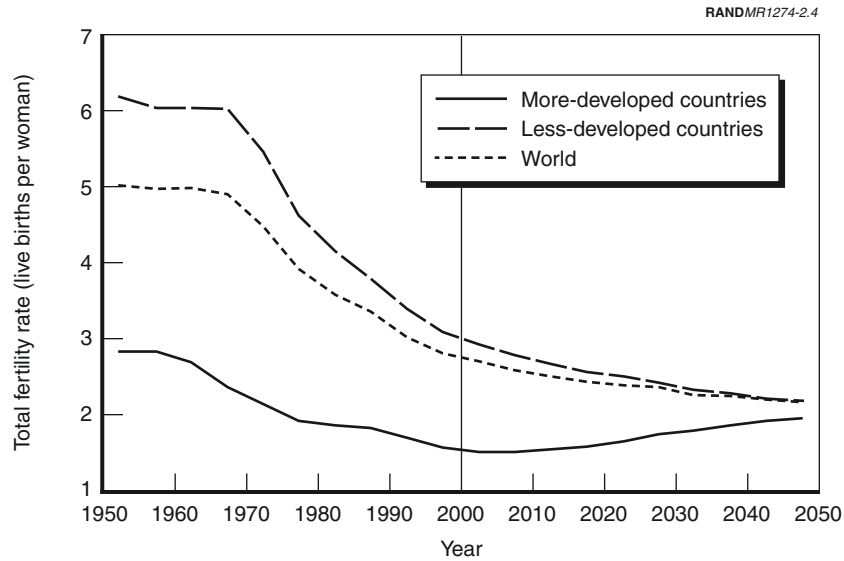
SOURCE: United Nations, "World Population Prospects: The 2000 Revision," CD-ROM, 2001.

NOTE: Post-2000 data are UN projections.

Figure 2.3—Trends in the Infant Mortality Rate at Different Levels of Development

percentage of couples using contraception tripled, to 31 percent, in just 14 years (1975–89) (Shahid Ullah and Chakraborty, 1993).

Other changes have reinforced the trend toward lower fertility, as it becomes advantageous to have smaller families. If children have a higher chance of survival and a long life expectancy, it is wise to invest intensively in them. A major form of investment is education—an investment that becomes more tempting when economic changes are likely to increase the potential returns on education. But this requires a long-term commitment. In a rural society, children typically start working on the land quite early and become economically productive at a young age. Educating children limits their productivity during childhood (they are at school rather than working). However,



SOURCE: United Nations, “World Population Prospects: The 2000 Revision,” CD-ROM, 2001.

NOTE: Post-2000 data are UN projections.

Figure 2.4—Trends in the Fertility Rate at Different Levels of Development

with increasing urbanization, children are less likely to be economically productive and the labor market will place a greater premium on skills, so education makes a greater difference to their future productivity. Thus urbanization raises the incentive of parents to educate their children while it reduces the opportunity cost of education in terms of forgone labor income. Because education is expensive, it becomes more likely that couples will choose to invest greater resources in fewer children. In addition, a greater emphasis on education will inevitably lead to more educated women. This reinforces the likelihood that families will become smaller: Women’s time becomes more valuable and they are less likely to want to spend so much of their adult life bearing and raising children (Birdsall, Kelley, and Sinding, 2001, p. 13). For many reasons, then, smaller families

make increasingly sound economic sense once the demographic transition gets under way.²

The decline in mortality and the decline in fertility jointly form the demographic transition, but they are not synchronized. The lag between the two causes population growth, as fertility only begins to decline some time after mortality has dropped (see Figure 2.5). This growth at the beginning of the demographic transition has preoccupied the prevailing views of population change and economic growth. However, the demographic transition also has a predictable impact on a country's age structure. At first, there is a cohort of children that includes many who would previously have suffered an early death. This baby-boom generation is unique: As fertility rates decline and families grow smaller, successive cohorts tend to be smaller. The result is a "bulge" in the age structure, a "demographic wave" that works its way through the population. (Figures 2.6, 2.7, and 2.8 show this moving bulge, and successive waves of it, for developing countries as a whole, East Asia, and Ireland, respectively. Figure 2.9 shows that only the beginnings of such a bulge are evident in sub-Saharan Africa.)

These figures reflect the age-structure effects of the demographic transition. First, there are many young people, who need to be fed, clothed, housed, cared for medically, and educated. Then, they become adults who are more likely to spend only part of the income they generate on their own needs. The rest is used to provide for children or is saved, most often for retirement. Finally, there is a large cohort of elderly people, who work less—or not at all—and become "dependent" again. They either live off their own savings or are supported by their families or the state.

The effects of the modern demographic transition can be felt for several generations. An initial spurt of population growth occurs between the beginning of the mortality decline and the end of the fertility decline. But when the baby-boom generation itself reaches the prime reproductive years, it creates its own echo: a succeeding baby boom. Subsequent echo effects produce further spurts. In other

²Montgomery, Aruends-Kuenning, and Mete (1999) discuss the dynamics between fertility rates and education in Asia.

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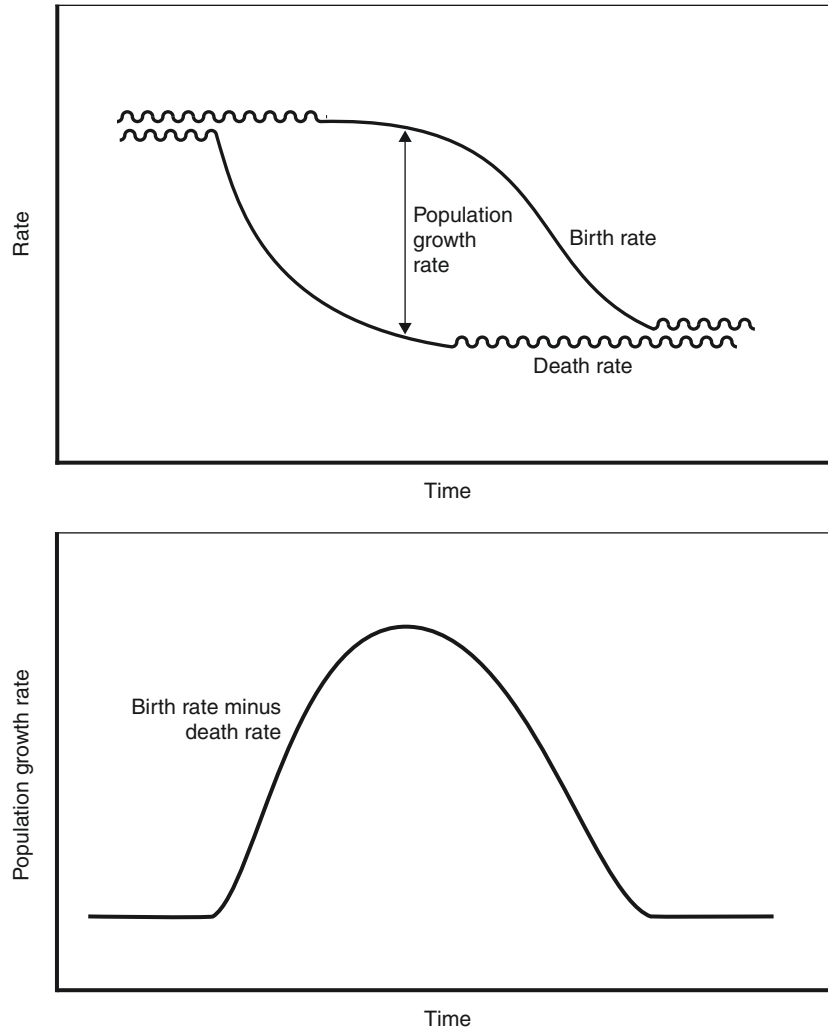
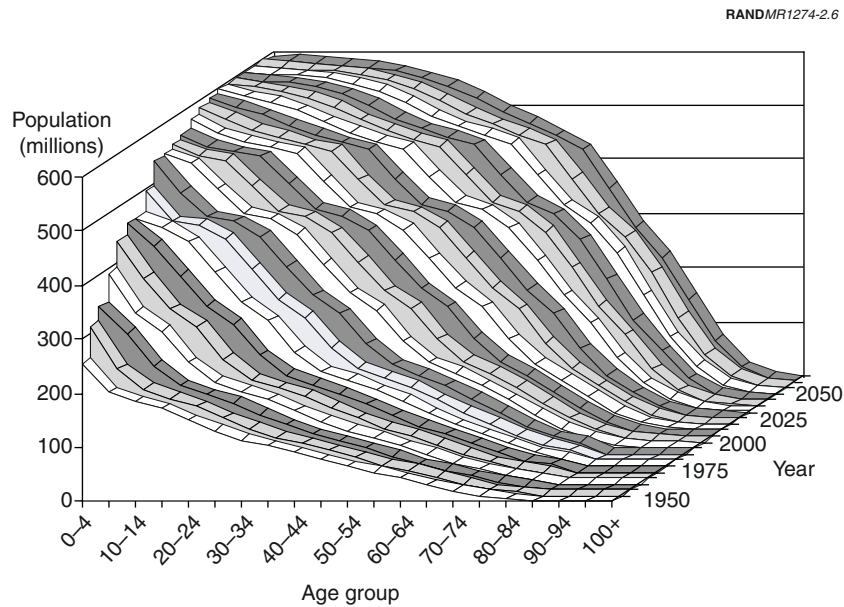


Figure 2.5—The Demographic Transition, and Population Growth Rate over the Course of the Demographic Transition

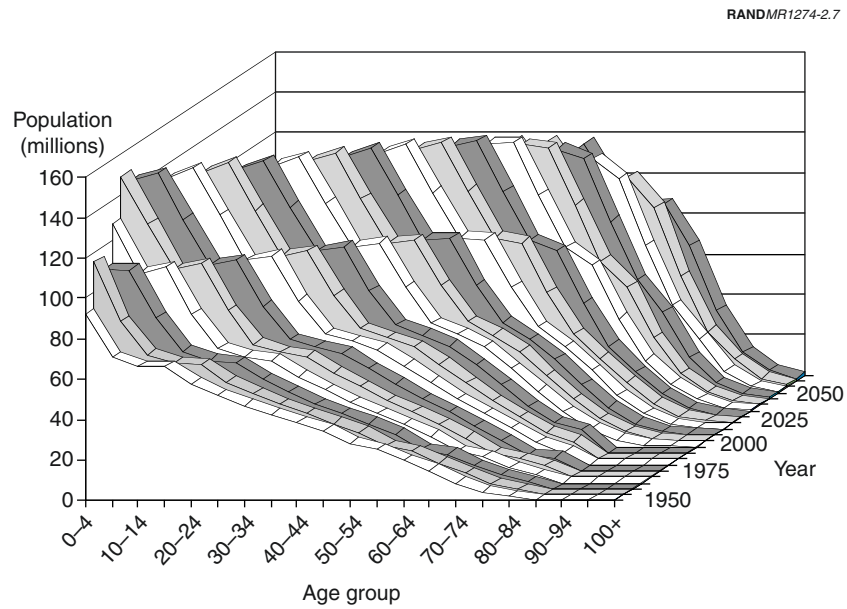


SOURCE: United Nations, "World Population Prospects: The 2000 Revision," CD-ROM, 2001.

Figure 2.6—Population by Age Group and Year, Less-Developed Regions

words, even if total fertility rates have been reduced to replacement level (2.1 children per woman), the population will continue to grow until the members of the bulge generation and successive echo generations tend to have passed through their prime reproductive years.³ This process is called population momentum, and its effects will be felt for perhaps 50 to 100 years before the population age structure settles down. Because of the effect of population momentum alone, the population of developing countries as a whole is expected to increase by 40 percent between 1995 and 2100 (Bongaarts, 1999; Bloom, 1999).

³ Assuming constant rates of age-specific fertility, the echo generations will perturb the age structure of the population in less and less pronounced fashion, as they are further removed from the initial baby boom.

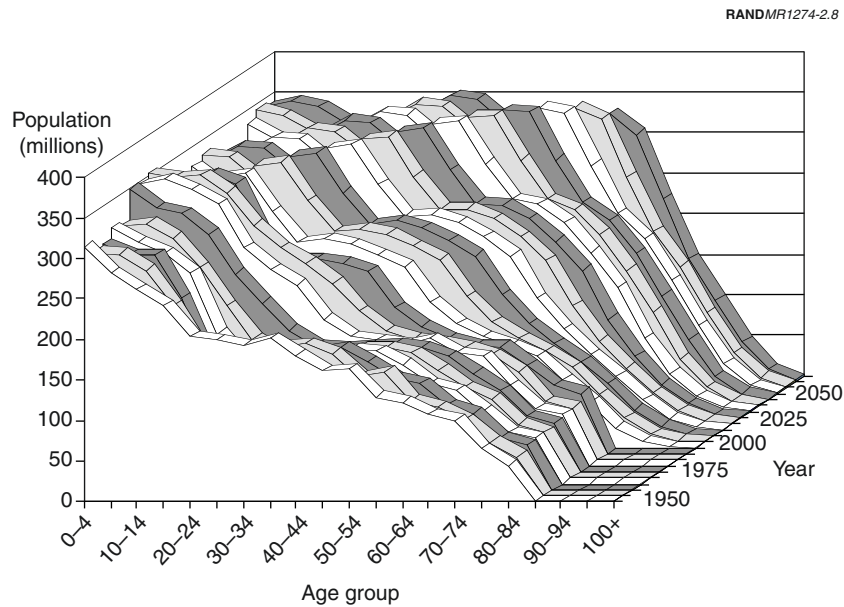


SOURCE: United Nations, “World Population Prospects: The 2000 Revision,” CD-ROM, 2001.

Figure 2.7—Population by Age Group and Year, East Asia

While many economists have studied the effect of population growth on economic growth, far less attention has been paid to changes in the age structure brought about by the demographic transition. Combining the population growth rate and the growth rate of the *economically active* population captures the way that age structures change and delivers striking results.⁴ While population growth has a large and statistically significant negative effect on per capita income

⁴The economically active population comprises all persons of either sex who furnish the supply of labor for the production of economic goods and services as defined by the United Nations systems of national accounts and balances during a specified time-reference period (International Labour Office, 1996).



SOURCE: United Nations, "World Population Prospects: The 2000 Revision," CD-ROM, 2001.

Figure 2.8—Population by Age Group and Year, Ireland

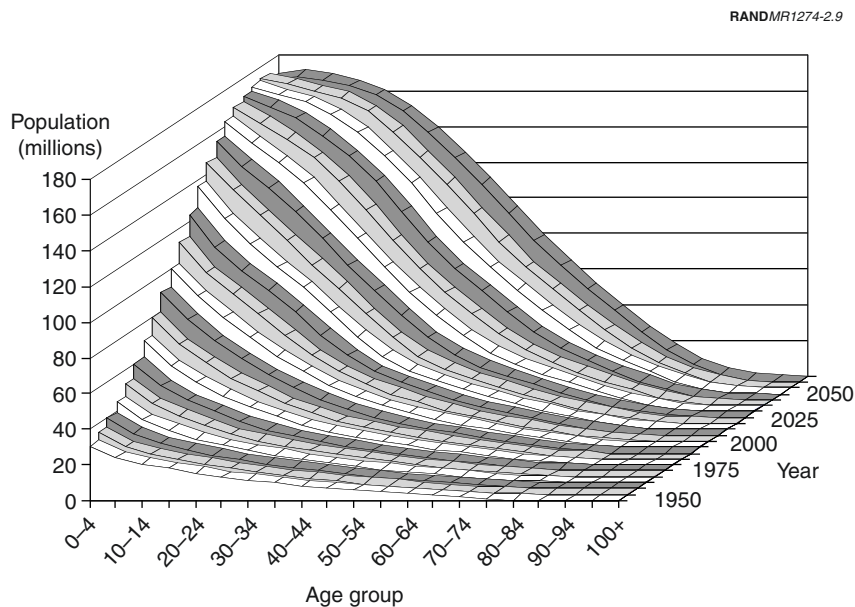
growth, this effect is counteracted by a statistically significant positive effect from growth in the share of the population that is economically active. While the age structure remains constant, therefore, the effect of population growth is neutral, but as the proportion of workers rises or falls, so do opportunities for economic growth. The demographic dividend, for example, was essential to East Asia's extraordinary economic achievements, accounting for as much as one-third of its "economic miracle" (Bloom and Williamson, 1998; Bloom, Canning, and Malaney, 2000).

Ireland is another country in which demographic events have had a powerful impact on economic growth. Ireland had been slow to complete the demographic transition. Before 1980, Ireland's total fertility rate was very high by European standards, with more than

3.5 births per woman. One reason for this was undoubtedly the legal ban on the use of contraception. However, in 1979 contraceptives were made available with a doctor’s prescription, and from 1985 on contraceptives could be sold to all those aged 18 and over. As a result, the crude birth rate in Ireland fell sharply, from 21.0 per thousand to 14.2 per thousand between 1980 and 1990. The falling birth rate led, of course, to falling youth dependency and a higher share of working-age people. It also encouraged rapid economic growth. From 1960 to 1990, the growth rate of income per capita was approximately 3.5 percent per annum. In the 1990s, this growth rate jumped to 5.8 percent, which is well in excess of any other European economy, thereby giving rise to the notion of the “Irish Tiger.”

Economic growth in Ireland was also fueled by two additional factors that increased labor supply per capita. The period 1980–2000 saw a large increase in female labor force participation rates. While one would expect rapid economic growth to encourage female labor participation, it seems likely that at least some of the increase was due to the availability of contraception and the increased freedom of women to choose between working and rearing children. In addition, Ireland has historically had large levels of outward migration of young adults (around 1 percent of the population per year) due to the inability of its economy to absorb the large inflows of young workers created by its high fertility rate. The loss of these young workers of course exacerbated the problem of the high youth dependency rate. The economic growth of the 1990s created enough jobs to reverse this flow, resulting in a small net immigration of workers, mainly from Eastern Europe.

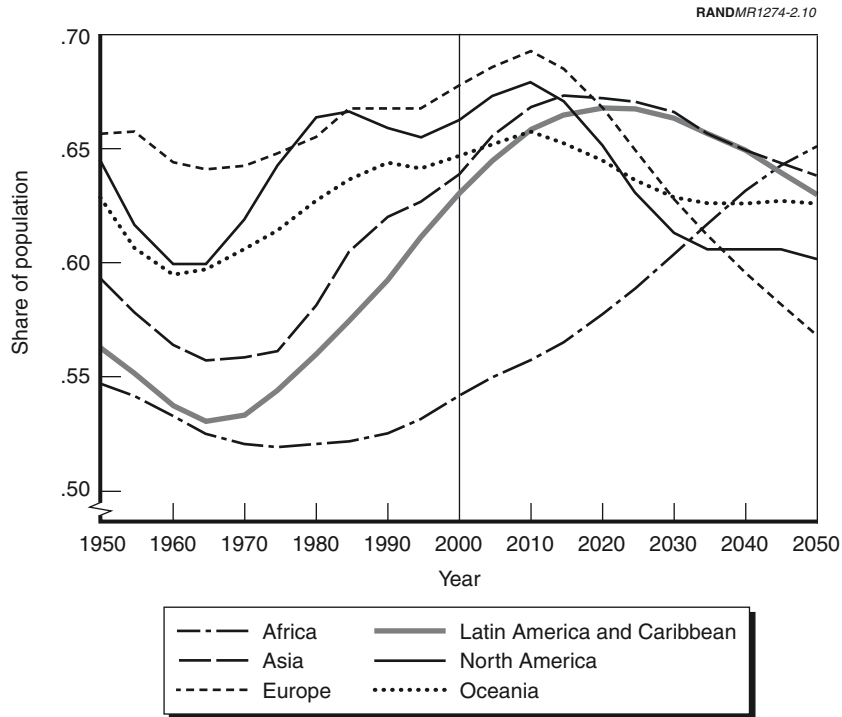
It is worth noting that Ireland, like the “miracle” economies of East Asia, had in place the right economic policies to take advantage of the demographic forces it has experienced. Two key policies were at work in Ireland. First, in the late 1950s, there was recognition that the “closed economy” model of development had failed in Ireland. This led to new policies with an emphasis on encouraging direct foreign investment in Ireland and promoting exports. Second, from the mid-1960s, free secondary education was introduced, leading to a large increase in school enrollments and subsequent expansions in higher education. The resultant high levels of education, combined with export-oriented economic policies, seem to be powerful factors in ensuring that the benefits of the demographic transition are realized.



SOURCE: United Nations, "World Population Prospects: The 2000 Revision," CD-ROM, 2001.

Figure 2.9—Population by Age Group and Year, Sub-Saharan Africa

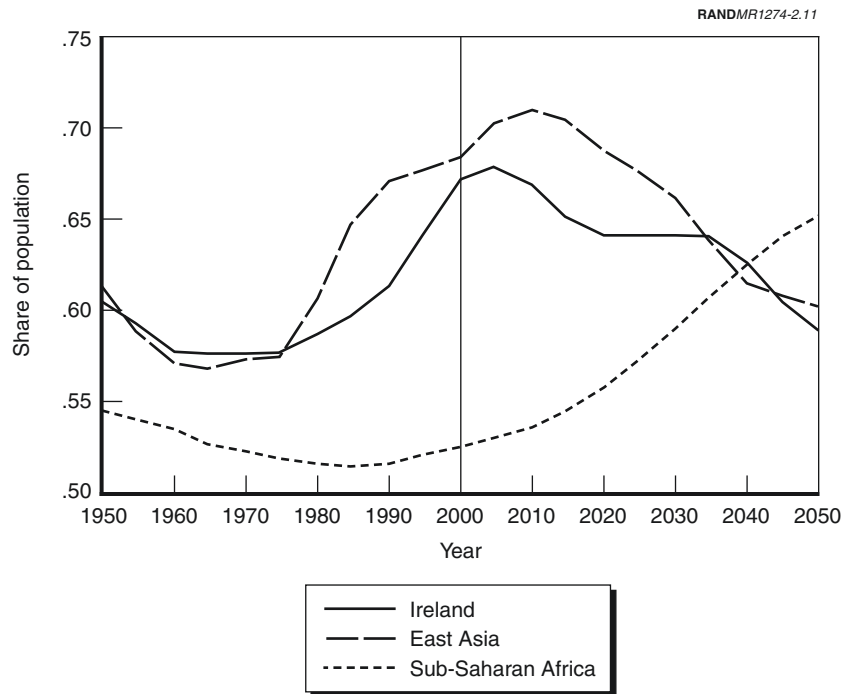
Demographic change in Ireland encouraged economic growth, but it did so because of key enabling aspects of the policy environment. Without the right policy environment, countries will be too slow to adapt to their changing age structure and, at best, will miss an opportunity to secure high growth. At worst, where an increase in the working-age population is not matched by increased job opportunities, they will face costly penalties, such as rising unemployment and perhaps also higher crime rates and political instability. With no policies in place to provide for rising numbers of old people, many may face destitution in their final years (Bloom and Williamson, 1998).



SOURCE: United Nations, “World Population Prospects: The 2000 Revision,” CD-ROM, 2001.

Figure 2.10—Share of Working-Age Population by Region

In addition, the demographic dividend is time-limited. Many developed nations are facing the end of their demographic transition, and now must plan for their aging populations and a decline in their ratio of workers to dependents. Figure 2.10 shows how the share of the population that is of working age has varied and is expected to vary over time in different regions of the world. Figure 2.11 highlights the same phenomena for East Asia, sub-Saharan Africa, and Ireland. In all regions except Africa, the share of the population that is of working age will begin to decrease in the next 10–20 years.



SOURCE: United Nations, "World Population Prospects: The 2000 Revision," CD-ROM, 2001.

NOTE: Post-2000 data are UN projections.

Figure 2.11—Share of Population of Working Age, Specific Areas

Additionally, some are experiencing shrinking populations. Low fertility rates over an extended period of time, where replacement level is not reached, eventually lead to population decline. Italy's population, currently at 57 million, is projected to decline to 43 million by 2050. Japan's population is expected to decrease from 127 million to 109 million by 2050 (United Nations, 2001). The available labor force will decrease, and the elderly will increasingly make up a larger proportion of the population, bringing with it further social and economic challenges (Bloom, Nandakumar, and Bhawalkar, 2001). Through the lens of demography at least, the next 50 years presents

the developed world with significant challenges, at the same time as it offers the developing world a number of appealing opportunities.⁵

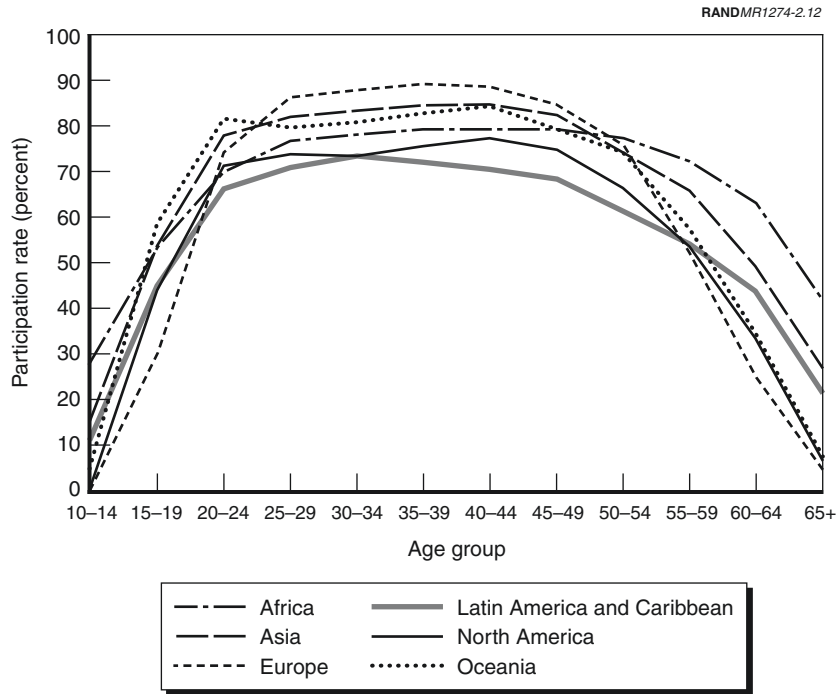
The Demographic “Dividend”

The demographic dividend is delivered through a number of mechanisms. The most important are labor supply, savings, and human capital.

Labor Supply. The demographic transition affects labor supply in two ways. First, there is an essentially mechanical effect, based on the regular and inevitable aging of the baby-boom generation (Bloom, Canning, and Sevilla, 2000). When this generation is between 15 and 64, it is more likely to be working, thus lowering the ratio of dependents to nondependents. (Figure 2.12 shows labor force participation rates by age group in various regions of the world.) During the peak working years of 20 to 54, this effect is especially strong. The number of people who would like to work (labor supply) therefore gets bigger and, provided the labor market can absorb the larger numbers of workers, per capita production increases.

Second, women are more likely to enter the workforce as family size declines. This effect is magnified by the fact that, with adult women

⁵See Teitelbaum and Winter (1985). Also, it is worth noting that a declining population, particularly in a country such as Japan, can carry with it the benefit of lessened pressure on natural resources. If the degradation of natural resource capital were accounted for properly, the trajectory of net national income would, other things equal, rise more quickly (or decline more slowly) as compared with that of a stationary or growing population. In addition, population decline does not necessarily translate into a comparable decline in the size of the labor force. This is due to the potential for (a) increased labor force participation among women, (b) increased retirement age, and (c) increases in net immigration, which tends to be selective of working-age individuals. Differences between the male and female labor force participation rate in Italy (23 percentage points) and Japan (21 percentage points) are higher than for most high-income countries (e.g., the differences for France and the United Kingdom are 12 percentage points and 14 percentage points, respectively) (see World Bank [2001] World Development Indicators; data for 1999). In addition, retirement ages have been relatively stagnant in comparison with life expectancy. Between 1965 and 2000, Italy’s life expectancy increased from 71 to 79, and Japan’s from 71 to 81. By comparison, retirement age in Italy is 62 for both men and women (up from 61 for men and 56 for women during that period) and 65 in Japan. An upward adjustment of the retirement age could mitigate the labor force effects of population aging. Finally, for more on immigration, see McCarthy (2001).



SOURCE: International Labour Office (1996).

Figure 2.12—Labor Force Participation by Age Group, in Various Regions of the World, 1990

themselves more likely to have been brought up in small families, they are more likely to be educated. This increases their productivity in the labor market, leading toward a stronger workforce and smaller families.

Savings. The demographic transition also encourages the growth of savings, thus improving a country’s prospects for investment and growth. Again, there is an accounting effect as well as a behavioral effect at work. The young and the old consume more than they produce, whereas working-age people tend to have a higher level of economic output and also a higher level of savings (Higgins, 1998; Higgins and Williamson, 1997; Kelley and Schmidt, 1996; Lee, Ma-

son, and Miller, 2000; Leff, 1969; Mason, 1988; Webb and Zia, 1990). Further, people tend to save more between the ages of 40 and 65, when they are less likely to be investing in their children and the need to prepare for their retirement is becoming more pressing.⁶ So when large numbers of baby boomers start hitting their 40s, national savings will tend to rise.⁷ Incentives to make certain choices can reinforce this tendency to save among the new young baby boomers. Improved health, and longevity, make saving easier and more attractive (Meltzer, 1992). A healthy population must plan far in advance if it is to maintain its standard of living through decades of retirement (Lee, Mason, and Miller, 2000). Pensions are made even more important by smaller families and the mobility that urbanization brings. An extended family often takes care of its own elderly relatives. A nuclear family, with both parents working, is far less likely to do so, although the two-earner family's increased assets make it better able to provide care financially, if not physically. Additionally, private household savings can provide the capital accumulation needed to finance growth, as seen in East Asia (Krugman, 1994; Young, 1994, 1995; Asian Development Bank, 1997, pp. 141–197; Higgins, 1998; Kelley and Schmidt, 1995, 1996). Further work is needed, however, to take account of the institutional features of pension systems when assessing the importance of the demographic transition to the determination of national savings.

Human Capital. Finally, the demographic transition has significant effects on investments in human capital, effects which are the least tangible, but may be the most significant and far-reaching. The demographic transition begins with changes in mortality that result in a population that lives longer and stays healthier. A longer life expectancy causes fundamental changes in the way that people live. Attitudes about education, family, retirement, the role of women, and work all tend to shift. A society, especially if it is taking full advantage of the demographic dividend, is certain to experience deep-

⁶These conclusions are based on data are from household surveys (Paxson, 1996; Deaton and Paxson, 1997). Coale and Hoover (1958) suggest that the dip in savings rate for people in their early 30s is related to the consumption needs of people with young families.

⁷Studies examining the relationship between age structure and savings include Leff (1969); Mason (1981, 1987); Webb and Zia (1990); Kelley and Schmidt (1996); Higgins and Williamson (1997); and Bloom, Canning, and Graham (2002).

rooted changes in its culture, as its people become more valuable assets. Take education, for example: The positive correlation between education and earnings is well-known. In Latin America, for example, a worker with six years of education earns an average of 50 percent more than one who has no formal education. The premium increases to 120 percent for those with 12 years of education (i.e., those finishing secondary school), and exceeds 200 percent for those with 17 years of education (i.e., those completing tertiary education) (Inter-American Development Bank, 1999). As life expectancy increases, parents are likely to choose to educate their children to more advanced levels. Healthier children, in turn, tend to experience greater cognitive development per year of schooling than their less healthy counterparts (Jamison et al., 1996). The parents also know that there is a good chance that each child will benefit from schooling investments over a long working life and, with fewer children, can devote more time and money to each child. The result of this educational investment is that the labor force as a whole becomes more productive, promoting higher wages and a better standard of living. Women and men therefore tend to enter the workforce later, partly because they are being educated for longer, but they are likely to be more productive once they start working (International Labour Office, 1996; Bloom, Canning, and Sevilla, 2001).

All these mechanisms are heavily dependent on the policy environment. A growing number of adults will only be productive if there is sufficient flexibility in the labor market to allow its expansion, and if there are macroeconomic policies that permit and encourage investment. Similarly, people will only save if they have access to adequate saving mechanisms and have confidence in domestic financial markets. Finally, the demographic transition creates conditions where people will tend to invest in their own and their children's health and education, offering great economic benefits, especially in the modern world's increasingly sophisticated economies. But governments invariably play a vital role in creating an environment where high-quality health and education provision is possible—necessary steps to make the most of their country's demographic opportunities.