5

The Populations of Poor Countries

5.1 An Extraordinary Phase

As the rich countries of the world complete a phase of population expansion, the poor countries have embarked upon an extraordinary and non-repeatable one of their own. The characteristics of this growth cycle are well described by the dry figures charting recent demographic growth in the so-called less-developed countries – namely, those countries whose populations live, by Western standards, in poverty.[1] The 1900 population of the poor countries, about 1 billion, had multiplied sixfold by the year 2020; during the twentieth century, these countries matched the expansion of the rich countries in the two centuries following the Industrial Revolution. That speed of growth is extraordinary. Between 1900 and 1920, we estimate the growth rate of the poor countries was about 0.6 percent per year; this rate doubled for the period 1920–50 (about 1.2 percent) and once again in the 1960s when the maximum rate of 2.4 percent was reached, followed by gradual decline in the following decades (Table 5.1). In contrast, the Western countries (Europe and its overseas projections) only rarely exceeded a rate of 1 percent during their two centuries of expansion. Since the 1950s, the poorer part of the world has grown at twice that rate (Figure 5.1).

The reasons for this difference are, on the surface, rather simple, though the underlying reality is complex. In the rich world, the demographic transition came about slowly as a result of a gradual decline in mortality, accompanied by a similar decline in fertility.

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Table 5.1 World population, rich and poor countries (1900–2020).

Population (in million)				Annual rate of growth (%)			% share		
Year	**Rich**	**Poor**	**World**	**Rich**	**Poor**	**World**	**Rich**	**Poor**	**World**
1900	563	1,071	1,634	–	–	–	34.5	65.5	100
1920	654	1,203	1,857	0.75	0.58	0.64	35.2	64.8	100
1930	727	1,309	2,036	1.06	0.84	0.92	35.7	64.3	100
1940	794	1,473	2,267	0.88	1.18	1.07	35.0	65.0	100
1950	813	1,712	2,525	0.24	1.50	1.08	32.2	67.8	100
1960	915	2,103	3,018	1.18	2.06	1.78	30.3	69.7	100
1970	1,008	2,675	3,683	0.97	2.41	1.99	27.4	72.6	100
1980	1,082	3,358	4,440	0.71	2.27	1.87	24.4	75.6	100
1990	1,144	4,165	5,309	0.56	2.15	1.79	21.5	78.5	100
2000	1,190	4,938	6,128	0.39	1.70	1.43	19.4	80.6	100
2010	1,236	5,696	6,932	0.38	1.43	1.23	17.8	82.2	100
2020	1,276	6,492	7,768	0.32	1.31	1.14	16.4	83.6	100
2030	1,282	7,287	8,569	0.05	1.16	0.98	15.0	85.0	100

Source: UN estimates; for 1900 author's estimate.

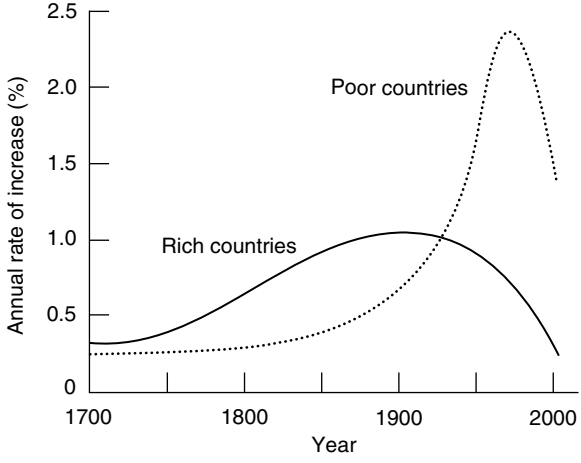


Figure 5.1 Comparison of demographic transitions: rates of increase for poor and rich populations (1700–2000).

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Slow mortality decline, as described in the previous chapter, was the result of an accumulation of knowledge, especially medical knowledge, which helped to bring infectious diseases under control – beginning at the end of the nineteenth century and continuing up to the present day. In the poor world, mortality levels remained high until recently. In 1950, for example, average life expectancy in poor countries was still around 40 years. However, from the mid-twentieth century onward, that knowledge slowly accumulated by the rich countries was rapidly transferred to the poor ones and mortality dropped dramatically. Fertility, largely dependent upon slowly changing cultural factors, either did not follow the trend in mortality or else did so slowly, and the two indices assumed widely divergent levels.

As mentioned above, the apparent simplicity of this process is misleading. The poor world is divided into societies characterized by vastly different environmental, cultural, and political settings, and these differences are reflected in the demographic behavior of individual populations. Nor has the poor world been isolated from the rich, so that a degree of knowledge and technology transfer took place before the 1950s. Table 5.2 describes global demographic diversity as measured by a number of now-familiar indices (for 1950–5 and 2015–20 for poor and rich, for large continental areas, and for India and China – these last two countries contain half of the total population of the poor world). These data permit us to make three general observations regarding the distinctive characteristics of rich and poor countries, the changing demography of the poor countries during recent decades, and interregional differences.

The differences between poor and rich populations are enormous: life expectancy today (based on the 2015–20 estimate) for the poor population is 71 years, and for the rich population it is 80 years; the average number of children per woman is 2.6 as compared to 1.6; and the poor population rate of increase at 1.2 percent is four times that of the rich world, though the gap between mortality and fertility levels was greater in the 1950s than it is today. It is also worth noting that around 1950, at the beginning of a demographic transition in the developing countries, mortality levels for these countries corresponded more or less to the European levels

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Table 5.2 Demographic indicators of world population (1950–2015).

	Population (in million)		Annual rate of growth (%)		Birth rate per 1,000		Death rate per 1,000		Total fertility rate (*TFR*)		Life expectancy at birth (e_0)	
Region	**1950**	**2020**	**1950–5**	**2015–20**	**1950–5**	**2015–20**	**1950–5**	**2015–20**	**1950–5**	**2015–20**	**1950–5**	**2015–20**
World	2,525	7,841	1.77	1.07	37.3	18.2	19.7	7.5	5.0	2.44	46.5	72.6
More-developed countries	813	1,276	1.21	0.29	22.0	10.1	10.2	10.1	2.8	1.57	66.6	79.6
Less-developed countries	1,712	6,565	2.04	1.23	44.4	19.8	24.2	6.9	6.2	2.57	40.9	71.1
Africa	229	1,361	2.15	2.48	48.2	33.7	26.6	8.3	6.6	4.47	37.8	64.3
Eastern Asia	666	1,663	1.75	0.09	40.8	10.5	23.3	7.3	5.7	1.52	42.9	78.7
South-Central Asia	512	1,970	2.03	1.16	44.7	18.3	24.8	6.5	6.1	2.37	39.3	70.4
Southeast Asia	165	670	1.92	1.00	44.3	17.1	24.7	6.9	6.0	2.18	40.5	72.1
Western Asia	51	287	2.64	0.88	45.3	19.8	21.8	5.5	6.4	2.61	45.2	73.1
Europe	547	746	1.00	0.11	20.9	9.9	10.6	10.9	2.6	1.53	66.2	78.8
Latin America and the Caribbean	169	652	2.65	0.89	42.0	16.0	15.6	6.5	5.9	1.98	51.4	74.9
North America	172	374	1.70	0.74	24.6	11.3	9.4	8.3	3.5	1.70	69.0	79.3
Oceania	13	43	2.21	1.70	27.7	16.6	12.3	6.4	3.8	2.29	60.9	78.8
China	544	1,425	1.53	0.38	43.6	10.9	25.0	7.0	6.2	1.55	40.8	77.5
India	376	1,396	2.00	1.06	44.1	17.7	25.0	6.6	6.0	2.18	38.7	70.3

Source: Adapted from United Nations, WPP 2024.

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of the mid-nineteenth century (life expectancy at birth being about 40 years); not so for fertility, as the developing-country level of 6.2 children per woman considerably exceeds Western levels of a century before (generally below 5 children). The difference lies in the effectiveness with which the European populations exercised the Malthusian check on marriage (late marriage and a high proportion of the never married), a check only rarely encountered among the poor populations.

Though the level of detail in Table 5.2 is loose, it nonetheless reveals great disparities within the developing world, a world that includes both the African (transition barely initiated) and Chinese (transition completed) populations: while these populations had similar total fertility rates and life expectancies in 1950–5, the respective values 70 years later were 4.5 as compared to 1.5 children per woman and 64 years as compared to 77 years of life expectancy. In the various continental areas, and even more so in the various populations that inhabit them, we find a gamut of intermediate situations.

This diversity is better displayed by examining these same indices for the 28 demographically largest nations of the several continents that make up the developing world (and contain over 80 percent of its population).[2] Figure 5.2 places each of these nations in the strategic space of growth (1950–5, 1980–5, and 2015–20) defined by life expectancy (e_0) and number of children per woman (*TFR*), according to the scheme described in Section 1.5. The differences are

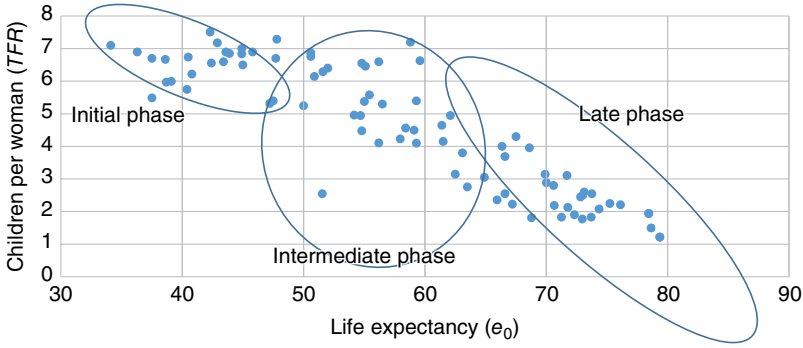


Figure 5.2 Life expectancy (e_0) and number of children per woman (*TFR*) in 28 less-developed countries, 1950–5, 1980–5, and 2015–20.

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obvious but require some interpretation. The space occupied in 1950–5 is more compact than that occupied in the other two periods; fertility and mortality vary little, and almost all the countries occupy the space above the isogrowth curves of 2 percent. In 2015–2020, the populations occupied a larger space, and most fell below the 2 percent growth curve (and some between 0 and 1 percent), a clear sign that the demographic transition is well advanced. Extremes, however, endure: countries with "old regime" life expectancies (countries south of the Sahara) and others whose level approaches that of the developed countries (those of Latin America); populations without birth control (Nigeria, R. D. Congo); and others with fertility levels below two children per woman (Brazil, China, Iran, and South Korea).

A final observation confirms the initiation of an irreversible transition. In the ellipse corresponding to 1950–5 (Figure 5.2), there appears to be no relation between mortality and fertility, since fertility is generally high throughout the poor countries (due to the limited spread of voluntary fertility limitation), regardless of the level of mortality. Mortality, on the contrary, had dropped in many countries as a result of the massive infusion of knowledge and technology from the 1940s onward. At the later date (2015–20), there is a clear and negative correlation between e_0 and *TFR*, as the high-life-expectancy countries are also those with reduced fertility. This came about in part because increased material well-being influences life expectancy and fertility in opposite directions, but also because improved survival has begun to have a direct influence on fertility, making high levels of the latter unnecessary and more expensive. In general, once this process has begun, it tends to perpetuate itself until mortality has completed its decline.

5.2 The Conditions of Survival

Reduced mortality and establishment of the chronological age-linked succession of death are prerequisites to development. Moreover, a reduction in infant and child mortality is one of the necessary conditions for fertility decline and the shift from a regime of

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demographic "waste" to one of demographic "economy." Beyond these fairly simple observations, we need to expand somewhat the general discussion of poor-world mortality decline.[3] First, we should consider the reasons behind the different rates of survivorship improvement for the various poor populations, which as a whole increased life expectancy during the half-century between the early 1950s and the beginning of the new millennium at a rate of 5 months per calendar year; regional rates ranged from less than 4 months per year in Africa to 7 months in China, and the differences are greater still if we consider smaller areas.

Survivorship improvement is achieved, first of all, by means of the reduction of infant and child mortality. The United Nations[4] estimates that the probability of a newborn dying before his or her fifth birthday was 40 per 1,000 in 2015–20 for the less-developed countries as a whole, but variation among regions was great: 74 per 1,000 in sub-Saharan Africa, 27 in Asia, and 16 in Latin America. By comparison, this level in the rich countries is barely 5 per 1,000. If the other countries of the poor world were to reduce their infant and child mortality to the level of China and the other countries of Eastern Asia, life expectancy would increase by 5 years in Africa and 2 years in southern Asia.[5] In other words, the elimination of infant mortality differences would eliminate much of the disparity in life expectancy and so is a primary objective in the quest for improved survivorship: its reduction not only represents a considerable decline in general mortality but also favors the modernization of reproductive behavior and improves the level of health at an age crucial to the development and subsequent efficiency of the survivors.

The causes of high infant mortality are many and complex: from infectious diseases typical of infancy (measles, diphtheria, whooping cough, polio, and tetanus) to a high incidence of diarrhea and gastroenteritis resulting from poor sanitation; to the combined action of malnutrition, poverty, and infection; and to the existence of vast malarial areas. There are solutions to all of these problems: the diseases typical of infancy can be combated with programs of vaccination and immunization; diarrhea and gastroenteritis with improved environmental conditions and hygiene; malaria with disinfestation; and malnutrition with programs of diet supplementation and, in

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many areas, by discouraging early weaning. When illnesses do occur, medical intervention can often prevent their lethality; in many instances, diarrhea, which kills by repeatedly attacking and dehydrating the infant, can be cured by simple rehydration methods administered by family members.[6] There are solutions, but only providing that the material resources, technical knowledge, and collective and individual awareness necessary to implement them – that is to say, education and development – exist.

A clear, if summarized, picture of the conditions accompanying infant mortality is provided in Table 5.3, which records several health indices for selected countries. High infant and child mortality go hand in hand with a lack of professional assistance at delivery, low immunization, and a high incidence of stunted growth. Figure 5.3 shows the relationship, for 53 poor countries, between mortality at the ages of 0–4 years and the percentage of the population served by adequate sanitation systems (sewage, etc.); the inverse correlation is quite evident.

The complexity of the causes of high infant mortality makes intervention difficult when attempting to pass from a "medium" level (the result of initial progress) to a low one like that of developed countries. I shall return to this question after having discussed the general mortality situation for the various populations, which is most concisely expressed by life expectancy (e_0). In Figure 5.4, life expectancy is compared with the classic index of well-being – per capita GDP (in international dollars) – for 28 poor countries.[7] As can be seen from the figure, this relationship is similar to that for the Western countries (see Figure 4.4): there is a big increase in life expectancy as per capita GDP increases from very low levels, but a gradual attenuation of survivorship improvement with subsequent increases in income. In other words, the growth of material well-being is progressively less effective at increasing levels of life expectancy. This relationship is in keeping with an initial phase of considerable mortality reduction linked to the introduction of relatively inexpensive and large-scale technology: antibiotics, DDT disinfestation, and certain vaccines.[8] Sri Lanka provides an example of this initial rapid phase of mortality decline[9] largely due to DDT spraying that has begun in the late 1940s and ended in 1950. Figure 5.5

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Table 5.3 Infant and child mortality and health indicators (2012–2022).

Countries	Year of survey	Infant mortality rate 1,000(1q0)	Infant and child mortality rate 1,000(5q0)	% deliveries in health facility	% of children receiving basic vaccines	% children with diarrhea receiving treatment	% children stunted	% children wasted	% children underweight	Mean duration (months) of exclusive breastfeeding
Africa										
D. R. Congo	2013–14	58	104	80	45	42	42	8	23	2.3
Egypt	2014	22	27	88	91	32	21	8	6	1.8
Ethiopia	2019	47	59	54	44	38	37	7	21	2.3
Ghana	2014	41	60	75	77	54	19	5	11	2.5
Kenya	2022	32	41	64	80	60	18	5	10	3.3
Nigeria	2018	67	132	41	31	42	37	7	22	0.5
Tanzania	2022	33	43	81	53	47	30	3	12	2.6
Asia										
Bangladesh	2017–18	38	45	51	89	85	31	8	22	3.5
Cambodia	2021–2	12	16	98	76	39	22	10	16	4.3
India	2019–21	35	42	90	77	67	35	19	32	4
Indonesia	2017	24	32	84	65	44	39	–	–	0.7
Pakistan	2017–18	74	62	74	72	66	39	7	23	2
The Philippines	2022	22	26	88	71	51	–	–	–	1.2

(*Continued*)

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Table 5.3 (Continued)

Countries	Year of survey	Infant mortality rate 1,000(1*q*0)	Infant and child mortality rate 1,000(5*q*0)	% deliveries in health facility	% of children receiving basic vaccines	% children with diarrhea receiving treatment	% children stunted	% children wasted	% children underweight	Mean duration (months) of exclusive breastfeeding
South America and the Caribbean										
Colombia	2015	14	16	97	68	61	13	1	3	1.8
Haiti	2017–18	59	81	38	41	43	22	4	10	1.7
Peru	2012	17	21	86	73	37	18	1	3	4.2
Dominican Republica	2013	27	31	99	52	52	7	2	4	0.4
Honduras	2011–12	24	29	85	85	60	22	1	7	0.7

Notes: Indicators refer to the 3 years preceding the survey; infant mortality refers to the 5 years preceding the survey; and anthropometric indicators refer to the percent of children 2 standard deviations below the mean.
Source: Adapted from The DHS Program, http://www.dhsprogram.com/.

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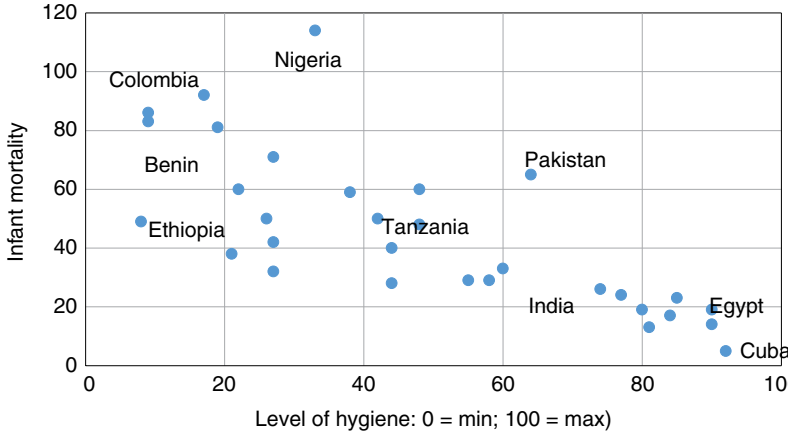


Figure 5.3 Infant mortality (q_{0-4}) and level of basic domestic hygiene in 31 developing countries, 2020. *Source:* Adapted from WPP2022, WHO and UNICEF.

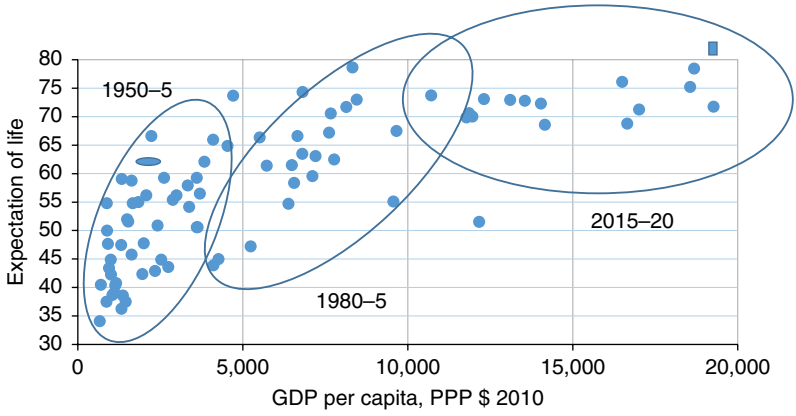


Figure 5.4 GDP per capita, PPP $ 2010, and life expectancy (e_0) in 28 less-developed countries, 1950–5, 1980–5, and 2015–20.

compares the mortality trends in two areas of Sri Lanka having the highest and lowest incidence of malaria; the effect of the 1946–7 disinfestation on the otherwise gradual rate of decline is obvious.

Further improvements in survivorship are not so easily achieved. In the 1970s, as poor-country mortality decline showed signs of slacking, criticism mounted in these countries aimed at health programs that emulated rich-country models and so depended upon the

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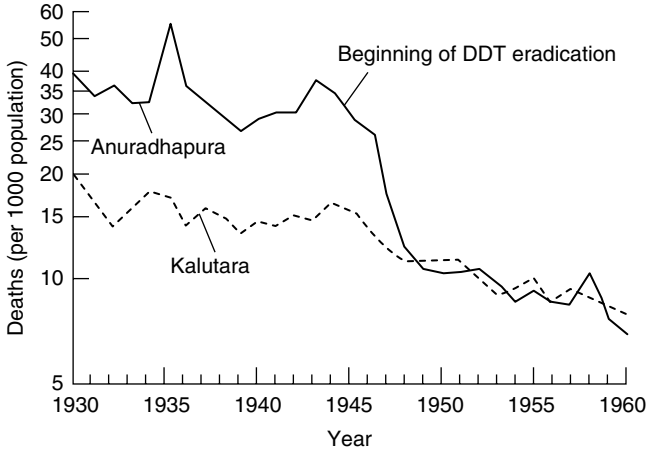


Figure 5.5 Mortality in the most malarial (Anuradhapura) and least malarial (Kalutara) zones of Sri Lanka (1930–60).

development of sophisticated and expensive hospitals, clinics, and schools. It was argued that these programs often were unable to serve the whole population and that, while good at diagnosis and cure, they did not attack the causes of high mortality.[10] At the end of the 1970s, the international health organizations (The World Health Organization [WHO] and United Nations International Children's Emergency Fund [UNICEF]) embarked upon a new strategy (called Primary Health Care [PHC]), which involved active community participation and used paramedical personnel (more easily trained) together with simple but effective technology.[11] In addition to services of disease prevention and cure, this strategy included educational programs, water and sanitation systemization, and the encouragement of the use of appropriate agricultural technology. It is a strategy aimed at the greater spread of effective, unsophisticated techniques and the development of individual and community awareness, which is the basis of that behavior indispensable to the reduction of mortality. Unfortunately, the application of these strategies, while theoretically appropriate, is difficult, since they require changes in individual and family behavior and they must operate through various channels of social activity, including schools, public health programs, and so on.

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To complete this discussion, we should return to Figure 5.4 for a moment. We can see that some countries lie considerably above the theoretical GDP–e_0 curve – that is to say, they enjoy a life expectancy considerably longer than we would expect given their level of well-being – while others lie below it and therefore have a lower-than-expected life expectancy. At the beginning of the 1950s, Nigeria, with the same GDP per capita as Thailand, had life expectancy of 16 years lower. Amartya Sen has pointed out that the survival prospects of African Americans are much worse than those of the Indians of Kerala or of the Chinese, even though the former are many times richer, even counting for differences in the cost of living.[12] In 2015–20, Vietnam had the same per capita income as India but an expectation of life was 11 years higher.

These huge disparities (which manifest themselves if we use other development indices as well) are proof of the fact that the accumulation of material wealth does not by itself guarantee improved health conditions, because of its unequal distribution among the population. Often the problem lies with the levels of individual, family, and community awareness, which do not necessarily increase with economic development. They are instead the product of deep-rooted cultural inheritance or of deliberate social and political action. Improved education, especially for women (because of their decisive role in child-rearing, domestic hygiene, and food preparation), appears to be a prerequisite to improved sanitary conditions. The fact that certain Islamic countries still have high levels of mortality in spite of considerable economic development has been explained by the subordinate status of women and the limited education they receive.[13]

Moreover, those countries that have had particular success in combating death are those in which government policy has allocated sufficient human and economic resources to the health sector. For example, China, Sri Lanka, Cuba, and Costa Rica – politically diverse countries that have made considerable efforts in this area – show that low mortality is within reach of even the poorest populations.[14] WHO estimates that 90 percent of deaths from infectious diseases are caused by pneumonia, diarrhea, tuberculosis, malaria, measles, and AIDS/HIV. For some of these diseases, low-cost health

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interventions are available (like oral rehydration therapy for diarrhea, already mentioned) that could easily prevent a large number of deaths. The incidence of malaria, for instance, could be drastically reduced by the use of bednets dipped in insecticide; inexpensive drugs are available for tuberculosis.

High mortality and high incidence of disease cost years of life and, for those who live with poor health, it is years of healthy life. Healthy survival is a prerequisite for many, indeed most, of the ingredients of development: the acquisition of physical efficiency, the achievement of intellectual ability and skills, and the extension of individual time horizons to allow planning for the future. It is also a prerequisite for changing the demand for children and, therefore, for fertility control. To assess improvements and make comparisons in this regard, it is important to combine survival measures and measures of incidence of disease. Survival indicators alone may reveal only part of the picture: reliance on medicine may prolong a life made miserable by inadequate nutrition and the absence of elementary hygiene. An important improvement over survival measures, for the purpose of our argument, is the calculation, for a given population, of the years lived in "good" and "bad" health. It has been estimated that the population of the planet, in 2019, had an expectation of life of 73.3 years, 63.7 of which lived in good health and 9.6 of which were not in good health (Table 5.4), a percentage of life (13) relatively stable in time.

5.3 A Brief Geography of Fertility

During the past few decades, the fertility of the poor world has been changing, and signs of the spread of voluntary control are ever more frequent. Areas that still conform to traditional procreational patterns now exist side by side with others that resemble instead the more-developed world. To obtain an initial impression of the changes that have taken place in the poor countries as a whole over the past 50 years, we should return for a moment to Table 5.2. The average number of children per woman has declined by more than 3, from 6.2 to 2.6, though China, which has reduced fertility to below-replacement levels (from 6.2 to 1.6), is responsible for almost

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Table 5.4 Life expectancy at birth, and life expectancy in good health, 2000 and 2019, world and regions (in years).

	Life expectancy at birth (e_0)		Difference	Life expectancy at birth (e_0) in good health (HALE)		Difference	Years lived in health not good, (e_0)-HALE	
	2000	2019		2000	2019		2000	2019
WHO regions								
Africa	52.7	64.5	11.8	45.8	56	10.2	6.9	8.5
America	74.1	77.2	3.1	64.1	66.2	2.1	10	11
Southeast Asia	63.4	71.4	8	54.5	61.5	7	8.9	9.9
Europe	72.5	78.2	5.7	63.7	68.3	4.6	8.8	9.9
Middle East	65	69.7	4.7	56.6	60.4	3.8	8.4	9.3
Western Pacific	72.4	77.7	5.3	64.3	68.6	4.3	8.1	9.1
World	66.8	73.3	6.5	58.3	63.7	5.4	8.5	9.6
World Bank classification								
Low income	53.8	65.1	11.3	46.9	56.7	9.8	6.9	8.4
Lower middle income	62.2	69.4	7.2	53.8	60	6.2	8.4	9.4
Upper middle income	70.6	76.3	5.7	62.4	67	4.6	8.2	9.3
High income	77.6	80.9	3.3	67.7	69.8	2.1	9.9	11.1

Note: HALE, Health-adjusted life expectancy.
Source: WHO.

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half of this decline. Fertility in the other large areas of the poor world differs widely: African fertility has undergone a moderate decline from 6.6 to 4.5 children per woman, and birth control, south of the Sahara, is still rare;[15] the change in southern central Asia has been larger still, with a reduction from 6.1 to 2.4, and this decline is due primarily to lower Indian fertility; and southeastern Asia and Latin America have registered larger declines and are now well below replacement. Taking into account the different scale of the demography of the poor world today, the current situation resembles that of the Western world at the beginning of the twentieth century when areas where fertility control was widely practiced (like France) coexisted with others where "natural" fertility still prevailed (like certain areas of Mediterranean Europe or the northern and eastern peripheries of the continent).[16]

Fertility decline seems to have accelerated in recent years, an observation supported by a comparison of the results of Demographic and Health Surveys (DHS) taken from the late 1980s to the present.[17] Even in sub-Saharan Africa, fertility control seems to take hold although one would hope for a faster decline, given the very high rate of population growth. In some countries (Ghana, Kenya, Nigeria, and Tanzania), the decline has stalled, raising worries as to future trends.[18] Elsewhere, large countries such as Brazil, Iran, and Vietnam (besides China and South Korea that have fertility levels below the lowest fertility of large European countries such as Russia, Germany, Italy, or Spain) are now well below the replacement level.

Explanation of these trends requires analysis of the principal components of human fertility, discussed in Section 1.4. Recall that the average number of children per woman (*TFR*) is determined by a combination of factors, predominantly biological, which determine natural fertility (birth intervals linked to the duration of breastfeeding, waiting time linked primarily to the frequency of sexual relations, and fetal mortality); by marital patterns (age at marriage and percentage unmarried); and by the level of birth control.

I have already made reference to the fact that the "initial" fertility level of the poor countries – over six children per woman – was considerably higher than that of the West prior to the demographic transition (less than five). This is primarily due to higher levels of

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nuptiality: poor-country age at marriage (or the age at which a stable reproductive union is established) has traditionally been low, with almost no one remaining unmarried, unlike the situation in the West. The World Fertility Survey (WFS)[19] revealed, for the late 1970s, an average age at first marriage of 19.8 years in 12 African countries; 21 years in 13 Asian and Pacific countries; and 21.5 years in 13 Latin American and Caribbean countries. These levels, considerably below the Western average of about 24 years, are already 1–1.5 years above the levels of 15 years earlier.[20] The proportion of women remaining unmarried at the end of the reproductive period was, in the poor countries, only a fraction of the level prevailing in the West.[21] The situation is in rapid motion, although with unequal speed, and the age of women at first union is increasing rapidly whenever women's prerogatives are reinforced in terms of education, wages and income, less discrimination, and less inequality within and outside the family.[22]

However, although the Malthusian check does reduce fertility, its effectiveness is limited. For example, in the absence of voluntary fertility control, an increase in age at marriage from 18 to 23 years (a radical change in nuptial behavior) will result in a reduction of the number of children per woman of 1.5–2. This reduction is too small to bring fertility down to levels compatible with moderate rates of population growth. Moreover, delayed marriage must translate into an effective delaying of women's entry into motherhood and implies that reproduction be confined to within marriage. While this is true in Asia, where nonmarital fertility is practically negligible, it is not true in Africa, Latin America, and the Caribbean, where reproduction outside marriage is common.

The decisive check to fertility, however, is its voluntary control. A simple measure of its "prevalence" is the percentage of women of reproductive age who, in a given period, use some methods of birth control. This percentage in turn can be broken down according to the method used ("traditional" and less-efficient methods, like coitus interruptus or periodic abstinence – rhythm – or "modern," more efficient methods, like the pill, IUDs, and sterilization). Contraceptive prevalence of about 70 percent and above indicates low levels of fertility like those found in rich countries.[23] The WFS (for 38

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developing countries in the late 1970s) found levels of contraceptive prevalence of only 10 percent in Africa, 23 percent in Asia, and 40 percent in Latin America and the Caribbean. About three out of four of the women practicing some form of birth control used the so-called "modern" methods.[24] The countries investigated by the DHS between 2011 and 2014 show that contraceptive prevalence is still very low in Africa, remaining below 30 percent in countries like Nigeria and the Democratic Republic of Congo, Africa's giants. There is still a lot of ground to be covered, if we think that even in the poorest countries, like Cambodia (56 percent) and Bangladesh (61 percent) in Asia, and Honduras (73 percent) and Bolivia (61 percent) in Latin America, the proportion of women using contraception is more than double the sub-Saharan average.[25]

Figure 5.6, sourced from a World Bank survey, depicts a model of the factors responsible for reducing the average number of children per woman from traditional levels to replacement levels in a number of poor countries.[26] The model shows the contributions, positive or negative, to *TFR* reduction (from a maximum of 7 to a minimum of 2.1 children per woman) made by changes in age at marriage, duration of breastfeeding, contraceptive prevalence, the frequency of abortion, and a series of other residual factors. One of these factors – the declining duration of breastfeeding – has, in fact, contributed to fertility increase.

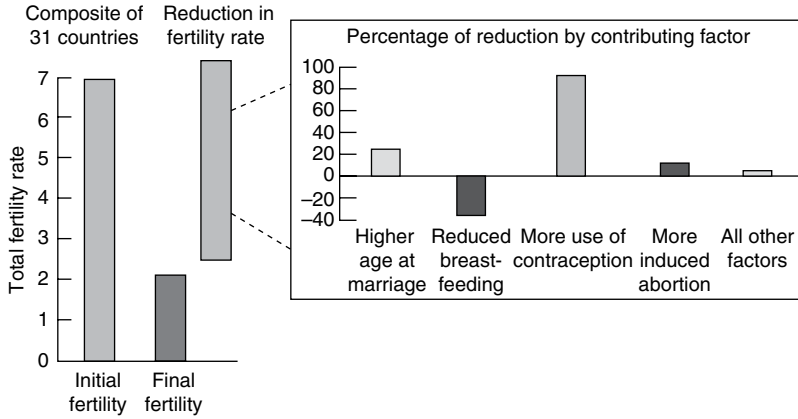


Figure 5.6 Model of the contributions of various factors in reducing fertility from natural to replacement levels. *Source:* Adapted from The World Bank 1984.

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The demographic transition in these countries has entailed a shorter period of breastfeeding which, all things being equal, would have led to shorter birth intervals and a 31 percent increase in *TFR* (equal to 1.5 children). All things, however, were not equal, and the other factors led to an overall reduction. First among these factors was increased contraception (−93 percent = −4.5 children), followed by a higher age at marriage (−28 percent = −1.4 children),[27] and higher frequency of abortions (−10 percent = −0.5 children).

We can conclude this discussion of poor-world fertility by considering Figure 5.7, which compares per capita GDP and *TFR* in 28 large developing countries in the early 1950s, 1980s, and 2015–20 (as has been done in Figure 5.4 for life expectancy). The relationship resembles that revealed by the analogous comparison for the rich countries (see Figure 4.8): as income increases, fertility decreases, but the amount of decline is progressively less. Naturally, this relationship is obtained only by drastically simplifying a complicated and diverse reality. Deviation from the abstract income–fertility curve of Figure 5.7 may be considerable. Nowadays, no human group appears to be immune to low fertility, with the exception of small minorities, highly committed to ideals of large families (for example, orthodox Jews, members of some reformed churches in America) often a part of

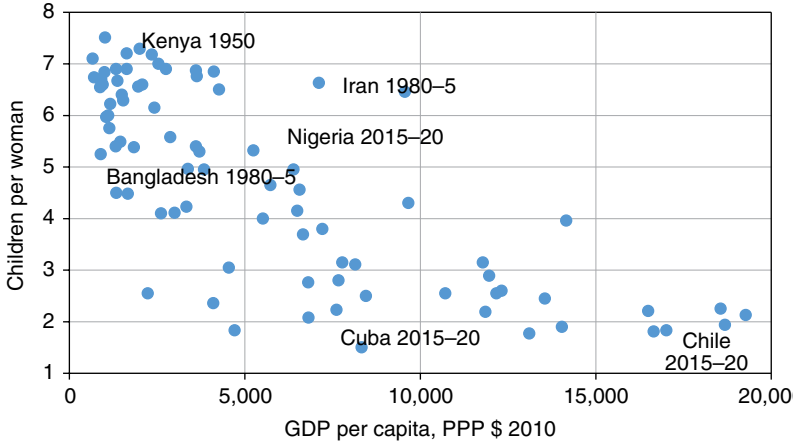


Figure 5.7 GDP per capita and children per woman (*TFR*) in 28 less-developed countries.

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mainstream society. Low and very low fertility can be found among Christians and Agnostics, Muslims (Iran, Turkey), Hindus (southern India), Buddhists, and Confucians. Low fertility prevails in countries very rich and in countries very poor; in ultra-capitalist and socialist countries; under democratic and autocratic régimes. Of the 10 most populous countries, only two (Nigeria and Pakistan) have fertility above replacement; the other two (India and Indonesia) are about replacement; the other six are well below. It is likely, therefore, that in the next few decades low or very low fertility – now the lot of countries where two-thirds of the world population lives – will expand rapidly.

5.4 The Conditions and Prospects for Fertility Decline and Demographic Policy

Confronted with the rapid growth rates of poor populations in recent decades, scholars and social workers have debated at length the causes of high fertility and the factors that might bring about its decline, the prerequisite to moderate growth. The previous section discussed the mechanics of fertility, analyzing its various biological and social components. We have seen that increased age at marriage and, above all, the spread of birth control are the instruments of fertility decline. However, in order for decline to occur, a change in the reproductive plans of couples is necessary. We must therefore understand what determines these plans and what can be done to change them. To borrow the economist's terminology, we must understand what determines the "demand" for children on the part of parents – still high in many poor countries – and what the factors are that might change it.[28]

In the first place, we may take for granted that preservation and survival (of the individual, the family group, or the community to which they belong) are innate values of the human species, just as they are for other animal species. Fertility therefore must compensate for mortality; when the latter is high, the former must be so as well. From this point of view, five or six children per woman are compatible with normal pre-transition mortality levels. Often the risk of having no surviving heir induces couples to have many

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children as a sort of insurance, with the result that aggregate fertility is higher than general mortality. As stated above, mortality decline is a necessary prerequisite to fertility decline.

In many poor countries mortality, but not fertility, has declined considerably. Why does fertility remain high? Why has the "demand" for children by parents not slackened? First, the cost of raising children remains low. In rural areas and under certain conditions, children may constitute a net gain for their parents. The work performed by children and adolescents may offset the costs sustained by the family, which in any case are low in a poor economy.[29] Second, in many social contexts, parents consider children a guarantee of economic and material assistance, not to mention affection, in old age. Studies in Indonesia, Korea, Thailand, Turkey, and the Philippines reveal that 80–90 percent of parents interviewed count on receiving economic assistance from their children in old age.[30] In any case, it is natural to depend upon help from one's children in the event of great misfortune.[31] Third, cultural context often demands a large number of children: as an affirmation of the family, as a guarantee of generational continuation, or as the expression of deep-rooted religious principles. Finally, ignorance of birth control methods, unavailability of contraceptives, and inadequate medical and health services contribute to inadequate fertility control or increased recourse to abortion. Legislation restricting the spread of contraceptives can reinforce these barriers to fertility decline.

If these are the causes of high fertility, then it is necessarily by means of their modification that the birth rate might decline. Above all, mortality must decline. Figure 5.2 (in which fertility and mortality are compared) indicates that almost all countries with a life expectancy over 65 years have a relatively low *TFR*, the result of a certain degree of fertility control independent of socioeconomic conditions.

The increasing "relative cost" of child-rearing also appears to be a factor in fertility decline. This increase may, for example, come about as the result of expanded female education, so that women are less willing to give up the possibility of wage-earning employment in favor of housework and raising children. Other factors might include compulsory childhood schooling, which delays the beginning of a

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child's work life, or a general increase in well-being and the attendant requirements for greater investments in children. The creation of institutional mechanisms of social protection reduces the need of aging parents for support from their children, and so another incentive for high fertility is undermined. Other elements that tend to hasten fertility decline include the elimination of legislative obstacles to birth control, a policy actively supporting family planning, the spread of contraceptive knowledge and techniques, and the fact they are affordable and psychologically acceptable.

None of the above factors can, on its own, bring about the transition from high to low fertility levels, and the proper combination of factors is difficult to determine, since it depends upon many characteristics of the society in question. The elements discussed entail improvements in medical and health services, economic development, and social change (changes in values, empowerment for women, secularization of behavior) – essentially all the aspects of societal development. No one aspect will effect change, and each country will have to find the appropriate mix.

Nonetheless, certain forms of intervention are simpler or more contained than others and so are more probable instruments of policy. Since the 1950s, for example, family planning has been a preferred approach and, generally speaking, it is unlikely that fertility decline will occur without an adequate network of these services.[32] Today, the political acceptability of this sort of intervention is taken for granted, but this was not always the case. In the 1950s and 1960s, family-planning programs – often naively and even clumsily introduced – were opposed in much of the poor world. In those countries embracing a socialist political system or ideology, for example, it was claimed that economic development would spontaneously regulate fertility. In others, ruling nationalists viewed birth control policies as an attack on the numerical strengthening of the nation, while these policies were opposed on moral grounds in countries where religious fundamentalism played an important role. The support given by rich countries – especially the United States – to these programs, often with dubious motivation, was considered a subtle form of capitalist imperialism. However, in 1974, at the United Nations World

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Population Conference in Bucharest[33] (a conference restricted to official national delegations), China, Algeria, Brazil, and Argentina headed a large group of nations opposed to policies aimed at lowering population growth rates. On the contrary, many Asian countries, especially those of the Indian subcontinent, were in favor of such policies. A memorable slogan from that conference claimed that "development is the best contraceptive." In Mexico City 10 years later, again at a UN conference,[34] opposition had disappeared; all nations agreed that demographic growth should be curbed by the application of specific policies not necessarily linked to other development policies. In 1994, at the Cairo United Nations Conference on Population and Development, this point was reaffirmed and unanimously endorsed.[35]

What have the results of demographic policy (understood in the restricted sense of family-planning programs) been? (We shall for the moment leave aside the special case of China, whose coercive policy has been unique.) The answer to this question contains important implications for future policies aimed at reducing fertility and slowing down the speed of population growth. According to one conventional view, a large part of the variation in fertility in poor countries derives from the fact that a large proportion of women who would like to limit their fertility are unable to do so because they are unaware of the existence of contraception or because contraception is either not available or access to it (in some cases because of cost) is restricted. Making contraception easily available then – or as is often said, satisfying the "unmet need" for contraception – will accelerate fertility decline. Satisfying that need is the goal of population policies, a need that has gone some way to achieving over the past decades.[36] The existence of an "unmet need" is attested to by the fact that a percentage of pregnancies are unwanted, or poorly timed (therefore not wanted at that particular moment), and that a share of women who do not use contraception want either to avoid or postpone pregnancy.[37] In the initial pioneer phase, between the twentieth century's 1960s and 1990s, family-planning programs (if well designed and efficiently enacted) seem to have accelerated the decline of fertility in those countries with a good pace of development.[38] However, efforts to measure the "net" contribution ("net" of

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the effects of development) to fertility decline of the family-planning programs are plagued with difficulties, and results vary from next to nothing to almost one-half.[39]

Less-sophisticated supporters of the conventional view observe that contraceptive prevalence (the proportion of reproductive-age women currently employing contraception) is low where fertility is high and vice versa, and a close correlation of these variables is revealed in Figure 5.8c (based on the findings of DHS surveys carried out between 2005 and 2009 in 46 developing countries).[40] It follows that policies that increase contraceptive supply will increase contraceptive prevalence and bring about a proportional decline in fertility. This sort of argument, however, is like saying that building new schools will bring about an increase in primary education, irrespective of the fact that parents might not be willing to send their children to school or that teachers might be missing, and so on. In the case of fertility, contraception is only an instrument through which desires and aspirations may be realized.

A mirror–image approach as compared to the conventional "supply-side" view focuses instead on "demand," where demand refers to the children actively wanted by parents.[41] Simply put, the theory states that fertility is driven by the desires of women or couples. Populations with high fertility, then, also have a high demand for children. Even if the supply of family-planning services is high and they are efficiently run, they will be little used and fertility will remain high. This situation is particularly frequent in sub-Saharan countries and among many Islamic populations. Conversely, low demand for children coincides with low fertility even in the absence of family-planning programs. Indeed, in Western countries, fertility declined in the first two-thirds of the twentieth century in spite of legislation hostile to family planning and a limited supply of contraceptives (advertising contraceptives was illegal in many countries until the 1950s and 1960s). The level of fertility is then dictated by motivations, expectations, and desires. If these change, so will fertility. Figure 5.8 lends some support to this view. Indeed, Figure 5.8c – as we have seen – shows the close inverse relation between fertility and contraceptive prevalence, but the same association can also be seen between wanted fertility and contraceptive prevalence

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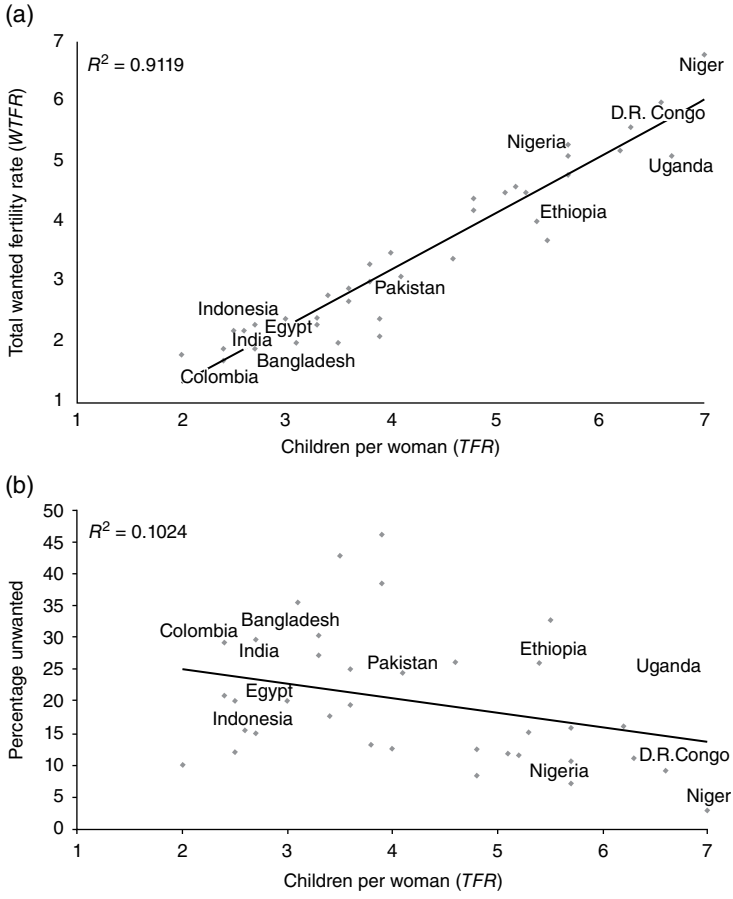


Figure 5.8 Relationship between the average number of children per woman (*TFR*), wanted and unwanted fertility, and contraception for 40 populations (2005–9) *Notes*: African countries: Benin, Congo, D. R. Congo, Ethiopia, Ghana, Guinea, Kenya, Liberia, Madagascar, Maldives, Mali, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Swaziland, Uganda, Zambia, and Zimbabwe. Asian and north-African countries: Azerbaijan, Bangladesh, Cambodia, Egypt, India, Indonesia, Jordan, Nepal, Pakistan, and the Philippines. Latin American countries: Bolivia, Colombia, Dominican Republic, El Salvador, Guatemala, Haiti, Honduras, and Paraguay. *TFR* = Total fertility rate. *WTFR* = Total wanted fertility rate. Percentage users = Population of women aged 15–49 years practicing some method of contraception. Percentage unwanted = Difference between *TFR* and *WTFR* as a percentage of *TFR*.

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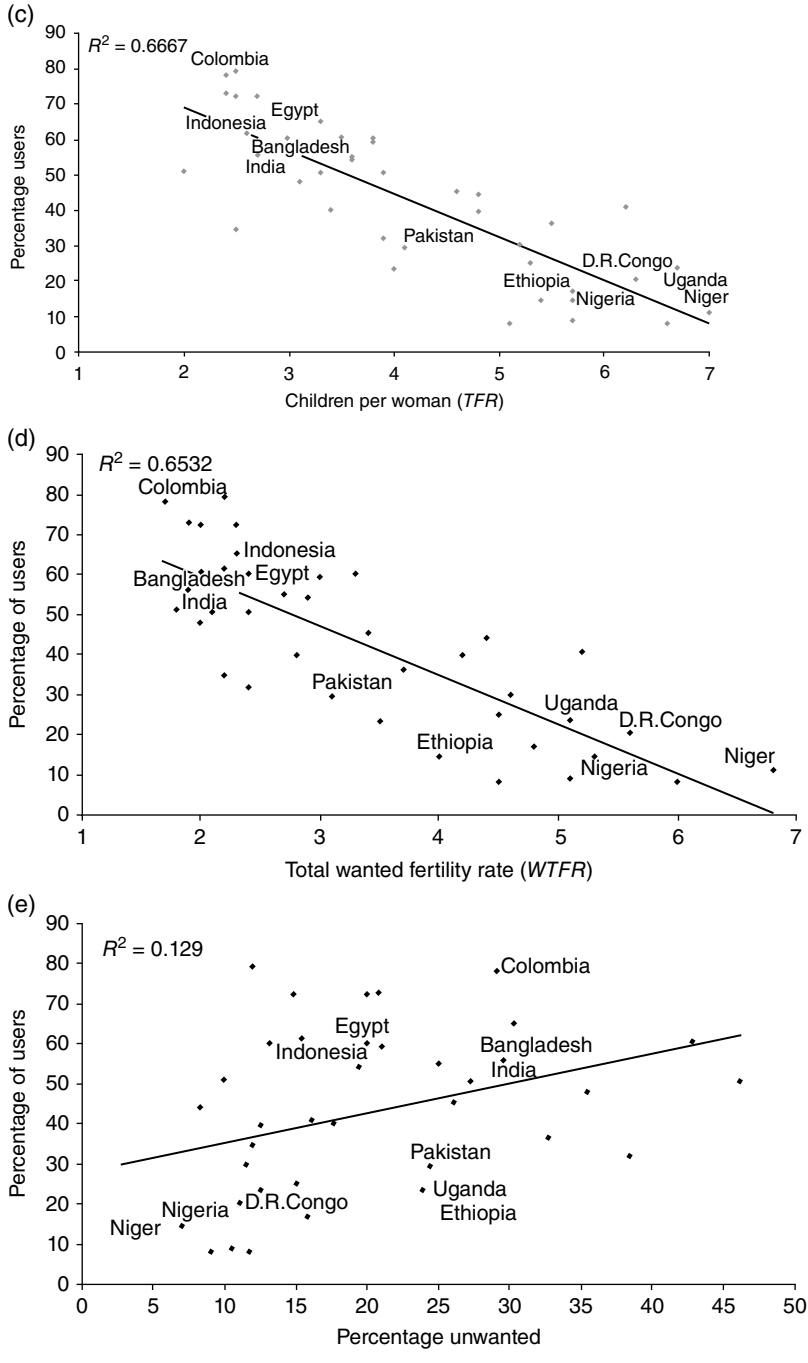


Figure 5.8 (Continued)

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(Figure 5.8d).[42] The close similarity of the two figures implies a very close association between actual and wanted fertility, as is indeed shown by Figure 5.8a. In other words, variation in actual fertility is almost completely explained by variation in wanted fertility. When fertility is high, wanted fertility is also high. Figures 5.8b and 5.8e are even more interesting. In Figure 5.8b, actual fertility is compared to the proportion of fertility that is unwanted.[43] As we can see, there is no correlation between the two variables: indeed, with the decline of fertility toward small family norms there is no attendant decline of unwanted fertility. On the contrary, unwanted fertility seems to increase in the intermediate stages of the fertility transition. A similar observation can be made regarding Figure 5.8e, where the proportion of unwanted fertility is compared to the prevalence of contraception. One would think that the increased prevalence of contraception should reduce unwanted fertility, but such is not the case. A study suggests instead that the variation of fertility across countries (holding desires constant) is explained only in minimal part by variation in contraceptive prevalence.[44]

To sum up: (1) fertility is driven by motivations and desires; (2) contraception is a necessary technical instrument for controlling fertility, but its availability – other factors being equal – has little impact on fertility and does not reduce unwanted fertility; and (3) policies directed to lower fertility must be "demand-oriented," trying to influence the factors that determine the propensities, desires, and motivations of couples.

This debate has been useful in providing better guidelines for policies. It is clear that small family norms, well-rooted in society, cannot be brought about by family-planning programs alone, no matter how well conceived and aggressive they might be. Paul Demeny identified four factors as particularly important in determining the fertility transition: (1) the direct cost parents must incur in raising and educating their children; (2) the opportunity costs of children to parents (or the earnings that a couple – in general the woman – forgoes because of children); (3) the contribution that children's labor makes to the income of the family; (4) the contribution of children to parents' economic security in old age relative to other forms of security.[45] Therefore, those policies that tend to favor the responsibility

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of parents in raising children, including bearing part of the cost of education and health; that encourage women to enter the labor force; that enforce compulsory education of children; that make child labor illegal; and that develop old-age private or public insurance schemes are conducive to fertility decline. The combination of these policies with well-balanced programs for family planning and reproductive health – which increase access to contraception, reduce its cost, and compress recourse to abortion – may accelerate a smooth transition to low fertility.

5.5 India and China

By the mid-1980s, almost all the governments of the world officially supported family planning to some degree; the United Nations announced that this was the case for 127 countries comprising 94 percent of the world's population.[46] However, behind these encouraging figures are both successes and failures, as well as combinations of the two. The cases of India and China are representative and merit attention if only by virtue of the demographic dimensions of both countries: together they accounted, in the 1950s, for about half the total population of developing countries.

Demographic data for the two countries are listed in Table 5.5 and require little commentary. Between the early 1950s and 2015–20, Chinese fertility was reduced by three-quarters, while that of India has declined by two-thirds; Chinese life expectancy at birth, at the same level as India's in the 1960s, is now 7 years longer. Today, Chinese fertility is way below replacement level, and its population has started shrinking in 2022. In contrast, the Indian population, because of its young age structure, will continue its moderate growth.

To understand these great differences, we must consider the demographic policies adopted by these two countries and their results. The Indian government has pursued slower demographic growth since 1952. The first two 5-year plans (1951–6 and 1956–61) called for the creation of family planning centers; and the fifth plan (1971–6) called for a crude birth rate of 25 per 1,000 by 1984 (clearly a goal that was not met, as the 1980–5 birth rate was 10 points higher).[47]

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Table 5.5 Demographic indicators for India and China (1950–2020).

	Population (in million)		Annual rate of growth (%)		% population under the age of 15 years			Children per woman (*TFR*)		Life expectancy at birth (e_0)	
Year	**China**	**India**	**China**	**India**	**China**	**India**	**Period**	**China**	**India**	**China**	**India**
1950	544	346	–	–	34.8	37.9	1950–5	6.1	5.8	45.3	42.1
1960	655	436	1.86	2.31	37.4	40.5	1960–5	5.8	6.0	45.7	46.1
1970	823	546	2.28	2.25	37.7	41	1970–5	5.1	5.5	58.6	49.2
1980	983	687	1.78	2.30	35.4	39.5	1980–5	2.7	4.6	65.3	54.7
1990	1,154	865	1.60	2.30	32.9	38.0	1990–5	1.9	3.9	69.1	59.2
2000	1,270	1,058	0.96	2.01	30.2	35.0	2000–5	1.6	3.2	73.0	63.6
2010	1,352	1,243	0.63	1.61	27.1	31.0	2010–15	1.7	2.5	76.2	68.1
2020	1,426	1,403	0.53	1.21	25.7	26.1	2015–20	1.6	2.2	77.2	70.1

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Accomplishments have been few and fertility decline minimal: in 1970, the percentage of couples (women of reproductive age) using birth control was very low (14 percent). For both males and females, the most frequent method was sterilization.[48] Success has been limited to a few states, the upper classes, and the urban population. Confronted with these poor results – caused by insufficient investment but also discontinuities in, and the difficulty of, administering the program in a country characterized by a variety of languages, religions, and customs – Indira Gandhi's government decided in 1976 to speed up the program. With the declaration of April 16, 1976, the government implemented a series of measures (including strengthening the existing program and increased financial incentives for the participants) and encouraged the state legislatures to pass laws making sterilization obligatory after the birth of the third child (only the state of Maharashtra passed such a law, and it was not enforced).[49] This coercive line inspired violent protests that were among the causes of the defeat of Gandhi's Congress Party in the March 1977 elections.[50] As a result, the Indian program suffered a notable setback. Indira Gandhi's return to power in 1980 and the unexpected results of the 1981 census (which revealed a population considerably larger than expected) led to a renewal of the demographic policy. The seventh 5-year plan of 1986–90 called for the achievement of replacement fertility by the year 2000. This was an unrealistic goal because it would have required a fertility decline similar to that experienced in China during the 1970s under exceptional and perhaps non-repeatable conditions; indeed, by 2000, fertility was still 50 percent above replacement. The Indian plan called for greater investment in the family-planning program; increased financial incentives for its participants; a big increase in sterilization and more widespread use of the IUD, as well as other forms of birth control; and combining family planning services with maternal and infant services.[51]

> Despite official support (for 30 years) of family planning, the government of India has not been able to organize a birth control program that regularly provides adequately staffed services to most of the population. At different times the responsible central agency . . . has promoted different methods

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> of contraception and tried different organizational approaches. At first, when modern contraceptives were not widely used anywhere in the world, there was a hope, soon disappointed, that periodic continence (the rhythm method) would reduce the birth rate in India, where it seemed to conform so well with Gandhian principles. Later there was primary reliance on the intrauterine device, but the health and family planning network never developed the capacity for skillful insertion, proper monitoring, and adequate counseling to counter exaggerated reports about the dangers of the device, to reassure patients about the side effects, or overall to obtain sustained high rates of insertion and retention. For various reasons, oral contraceptives have never been authorized for use in India.[52]

This was the harsh judgment of Ansley Coale, an expert on the Indian demographic situation. The only aspect of the program that enjoyed a degree of success was sterilization, the frequency of which increased dramatically in 1976–7 (8 million sterilizations in 2 years as compared to an average of 2 million per year in the preceding decade). After Gandhi's defeat, however, the sterilization program came to a sudden halt.

The 1980s should have signaled a new strategy, concentrating not only on family planning but also on those aspects of social and economic development that favor fertility decline: increasing age at marriage, raising the status of women, improving female literacy, enhancing child survival, alleviating poverty, and providing security for old age.[53] These good intentions, however, have had little effect. In spite of increased resources, the 1980s witnessed "a steep decline in the quality of family planning and public health practice" due to the increasing role played by bureaucrats as opposed to specialists.[54] At the end of his term as prime minister, Rajiv Gandhi issued sharp criticism of population policy failure in India, citing excessive bureaucratic centralization of the program, which allows little flexibility in a country characterized by vastly differing needs.[55] In recent years, the government seems to have adopted a more diversified approach: couples are provided with information on a broad range of family planning methods, and the family planning targets set in various districts have been eliminated in order to dispel fears of

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coercion. With a population that at the 2011 Census amounted to 1.210 billion and that in 2022 has become the most numerous in the world, the Indian government was, and is, wary of the nation's demographic future. A National Population Policy was launched in 2000 with the objective of stabilizing the population by 2045 (but for the latest United Nations projections this will happen in 2064, with a population of 1.7 billion). The government, aware of the fierce popular opposition to coercive policies, affirms that the new population policy will refuse coercion and force and will be based on "informed consent and democratic principles."[56] The policy seeks a closer involvement of local authorities; participation of men in family planning programs; incentives in order to raise the age at marriage; and incentives to couples having no more than two children. More precisely, these are aimed at couples living in poverty who postpone marriage after the legal age of 21 years and have no more than two children, or spouses who undergo sterilization after the birth of the second child. There is, however, considerable criticism concerning some aspects of the policy, particularly for the government-sponsored family planning camps where women can undergo sterilization for monetary gain. Convincing poorly educated women in remote communities to use contraceptives is more expensive than the mass sterilization campaigns, and incentives are often seen as forms of indirect coercion. Finally, there is a very worrying aspect of the recent demographic development of the country. The male-to-female ratio among the newborn has been increasing in many states, and particularly in those with higher standards of living. This is a widespread phenomenon in China and Southeast Asia, due to selective abortion induced by couples' preferences for male children. In many regions of the country, the worsening of this dramatic distortion generates a growing imbalance in the gender composition of the population. This will translate into the exclusion from marriage of a considerable proportion of men, particularly among the poorest strata of society, with complex negative consequences. Various measures are being tried, in India and elsewhere, in order to counter this dangerous trend.

The history of government family-planning programs in China differs considerably from that of India.[57] In 1949, Mao declared: "China's vast population should be viewed as a positive asset. Even

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if it should multiply many times, it will be fully able to resolve the problems created by this growth. The solution lies in production . . . Revolution and production can resolve the problem of feeding the population."[58] However, as the revolution was consolidated and the results of the 1953 census became known, concern over the population problem began to emerge. At the Eighth Party Congress in 1956, Zhou En-lai's speech included these remarks: "We all agree on the desirability of adopting measures favoring birth control, both for the protection of women and children and to ensure that the younger generations are brought up and educated in such a way as to guarantee national health and prosperity."[59] This first birth control program required the creation of an assistance network, the production of contraceptives, and a plan to encourage the population to use these birth control services and devices. However, demographic prudence was not in keeping with the ambitious socioeconomic program of 1958/9 – the Great Leap Forward – and the attendant blind faith in gigantic productivity goals. As a result, the program came to a sudden halt but, after the failure of the Great Leap Forward, poor harvests, famine, and the high mortality of 1959–61, a second campaign was launched with the creation of a Department of Family Planning. This second campaign that, among other things, introduced the IUD and advocated later marriage was essentially suspended during the Cultural Revolution. It was only with the return to normality in 1971 that the third campaign began. This was based on three principles: later marriage, longer birth intervals, and fewer children. Later marriage meant, for women, 23 years of age in rural areas and 25 years of age in the city; longer intervals meant 4 years between the first and second child; and fewer children meant no more than two children in the city or three in the country. In 1977, the latter limit was lowered to two for both city and country. The unquestioned success of this program in the 1970s was due to a system of birth quotas:

> According to this system, the Chinese government began to establish annual numerical objectives for the natural rate of population increase in each province . . . Provincial authorities

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> and prefects, in turn, translated their assigned rate into a birth quota, distributing this quota among the prefectures and counties under their jurisdiction. This process continued on down until it reached the work team or its urban equivalent.[60]

Within these groups, couples planning to have children met with group leaders to determine which were entitled to have a child the following year. About half of the couples practicing birth control used an IUD; about one-third used sterilization; and the remainder chose a variety of other methods, including a considerable proportion using steroids.[61] Abortion also became widespread and easily obtainable, free of charge, and did not require the husband's consent.

After Mao's death and the defeat of the Gang of Four, demographic objectives became both more explicit and more ambitious. During the second session of the Fifth National People's Assembly in 1979, Hua Guofeng affirmed that a large reduction in demographic growth was one of the essential conditions for the success of the "four modernizations" (of agriculture, defense, industry, and science and technology). Initially, the aim was to reduce the rate of natural increase to 0.5 percent in 1985 and 0 percent in 2000. In September 1980, Hua updated these objectives, the new goal being not to exceed 1.2 billion in 2000. To accomplish this goal, a birth limit of one child per couple was established in 1979, with exceptions for ethnic minorities, border areas, and couples in special situations. A series of incentives and disincentives have been introduced in order to meet this difficult goal. The primary tool has been the one-child certificate, issued by local authorities, which guaranteed a series of benefits for couples and their children in exchange for the commitment not to have more than one child. The benefits included wage and pension increases, larger dwellings, free medical care, and priority for the child in school. Couples who refused to cooperate and give birth to a second, or worse a third, child were penalized in the form of wage cuts, revocation of privileges, and other disincentives.[62]

The Chinese one-child policy has been pursued with varying intensity. Until 1983, pressure increased as coercive, even brutal, methods were implemented on a vast scale. The resulting protests and discontent, however, led to a period of uncertainty. On the one

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hand, recognition of the growing number of women of reproductive age born during the period of fertility increase that followed the catastrophic Great Leap Forward (between 1983 and 1993 the number of women aged 21–30 years increased from 80 to 125 million) argued for maintaining the policy;[63] on the other hand, the protest and resistance of a population denied one of the most basic of human rights urges its relaxation. The 1990 census counted 1.134 billion Chinese and revealed that the official goals could not be easily realized. Until 1985, government policy continued to target a population not over 1.2 billion by the year 2000, but this formula had later been made more elastic, calling for "about 1.2 billion," which in practice meant that the ceiling had been lifted to 1.25 billion. This limit was also officially revised to 1.3 billion, above the 1.265 counted by the Census in the same year.[64] The discontent of the population, denied one fundamental human right, was an argument for relaxing the coercive policy. The 1980s were indeed characterized by several examples of the relaxation of the policy: the progressive extension of the right of rural couples to have a second child when the firstborn is a girl, or permission granted on special, probably discretionary, grounds, or because the family lived in a remote area or had special characteristics.[65] Fertility decline stopped in the first part of the 1980s, and fertility even increased between 1985 and 1987. The dismantling of the socialist collectives, which were an essential tool of family planning policies, "led to an erosion of cadre power and a breakdown of the system of economic incentives and disincentives on which policy enforcement had been largely based."[66] Moreover, the process of economic liberalization and the general attenuation of public control over individual behavior increased the obstacles to full implementation of the policy. Nonetheless, at the beginning of the 1990s, the Chinese leadership renewed its commitment to the one-child policy, leaving the regulations intact and strengthening their implementation: a nationwide fertility survey put total fertility at 1.9 for 1992, well below the average level of the 1980s. Apparently, this new party-led drive enjoyed success, reinforcing commitment to family planning at all levels and responsibility systems, strengthening economic incentives and penalties, introducing old-age insurance schemes, and so on.[67] Continuing rapid economic growth and associated social change have also influenced reproductive norms

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and values, thus facilitating the task of policymakers. Many provinces offered exemptions to the one-child commitment to young people with no siblings. When two of these young people married, they were allowed to have two children. According to the legislation, the one-child policy was strictly enforced among couples holding a nonagricultural household registration status nationwide plus all couples in two large provinces (Sichuan and Jiangsu), representing 35 percent of the total population. The policy allowing couples whose first child was a girl to have a second child applied to 54 percent of the population. The residual 11 percent was made up of peripheral populations composed of ethnic minorities that were allowed to have two or even three children. These rules, if severely enforced, implied a *TFR* of 1.5 for the entire country. That this policy had to be abandoned or phased out has been a widespread opinion for years, and for three major considerations. The first consideration was that low-fertility preferences had become well rooted in the couples' behaviors and that, at the same time, coercive policies were at risk of being on a collision course with the aspirations and the modes of life of the young generations. It had been observed that a high proportion of couples living in rural areas and who were allowed to have a second child renounced this possibility. Various studies demonstrated that abandoning the one-child policy would have had a small effect on the aggregate fertility of the country. The second consideration was that the combination of the one-child policy and the deeply rooted aspiration to have a male heir had strongly altered the sex ratio at birth, which had increased to 120 (against a natural level of 105–106). This was, and is still today, the consequence of sex-selective abortion and of the higher infant and child mortality of baby girls in comparison with boys of the same age, because of various forms of child neglect and discrimination. It is true that a similar distortion is typical of other countries of Southeast Asia (and of India) that do not have a one-child policy; nevertheless, in China, the distortion has reached record levels. The third element was that very low fertility alters the age structure, accelerates the aging process, and weakens the support system of the older population. The acceleration of the aging process as the numerous cohorts born in the 1950s and 1960s will enter old age, the lack of an extended pension system, and the fact that the traditional support – a male child – may either not exist

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or may have migrated far from his aged parents, erodes the societal support of the older generations, and creates an explosive problem for the coming decades.[68]

After 35 years of existence – over a generation's time span – the one-child policy has been finally canceled. In October 2015, a communiqué of the Central Committee of the Communist Party announced: "To promote the balanced development of population, with adherence to the basic state policy of family planning, we must improve the strategy of population development, *universally implement the policy that a couple can have two children* and take active measures to deal with the problem of population aging."[69] In 2021, a further step forward, with the new *three-children policy*, has eliminated the existing disincentives to a third child, in the general context of support to fertility. In spite of great difficulties, Chinese demographic policy has clearly realized goals not even approached by the other Asian population giant. The reasons for this success are many, but may be summarized by the following:

1) Chinese social transformation has proceeded more quickly and efficiently in the area of public health care. Mortality as a result has declined more rapidly than in India, favoring fertility decline.
2) In the Chinese political system, the authority of the Communist Party ruling group extends through all levels of the administrative hierarchy down to the production squads. This system has allowed for the quick execution of demographic policy directives, a task facilitated by effective propaganda and indoctrination.
3) An efficient distribution and assistance network has been established, employing a variety of birth control methods, including abortion.
4) Chinese society may be more receptive to fertility limitation for complex cultural reasons. Other East Asian societies, linked to some degree to the Chinese, have experienced rapid fertility decline in a variety of socioeconomic contexts; these include Japan, Taiwan, South Korea, Singapore, and Hong Kong.[70]

The age structures for China and India in 1950 and 2025 are compared in Figure 5.9. In 1950, the shape of these structures was similar, and China had a larger population in each age group: 544 million

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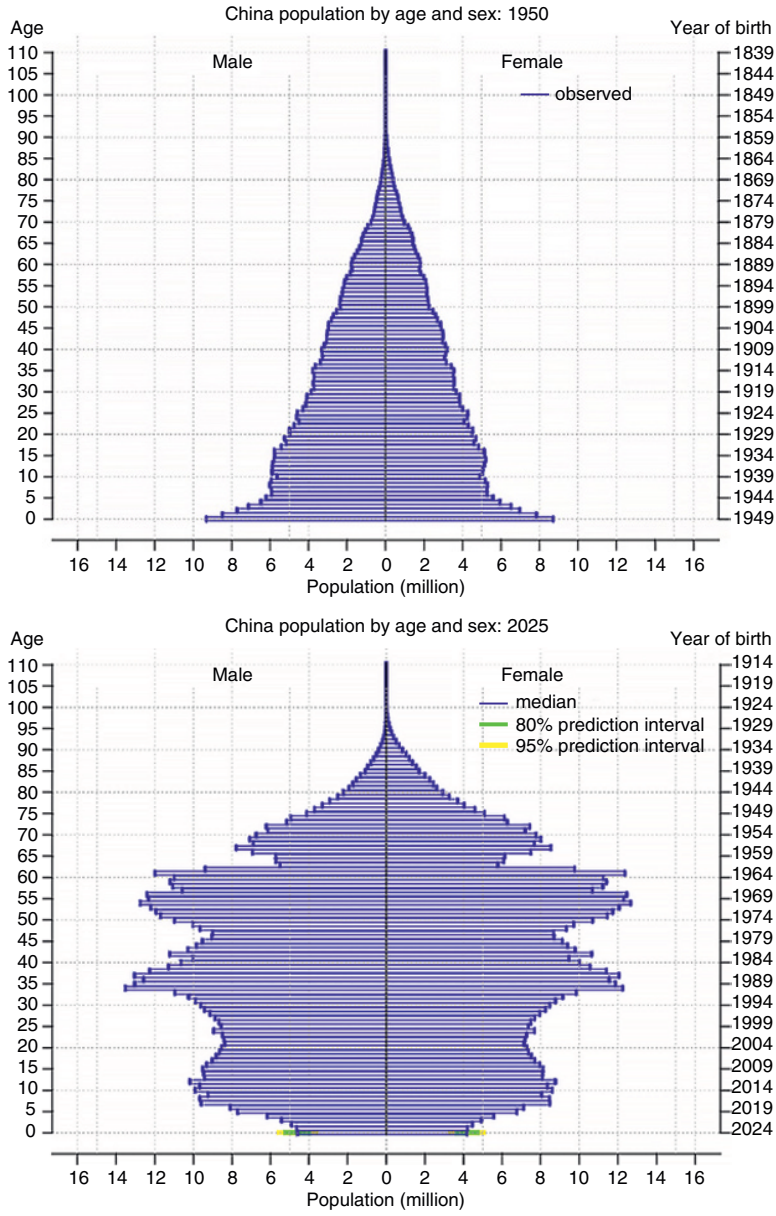


Figure 5.9 Population of China and India, 1950 and 2025, by sex and age.

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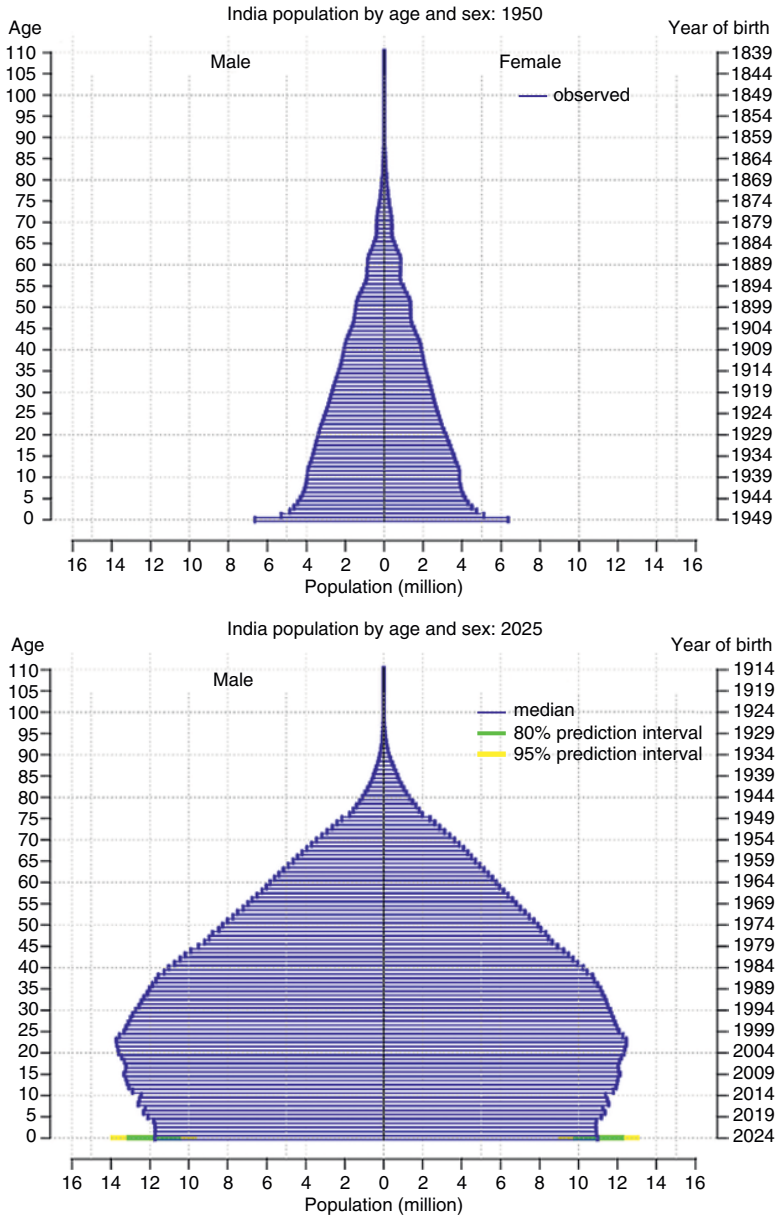


Figure 5.9 (Continued)

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total in China as opposed to 376 million in India (+44.7 percent). In 2025, the population of China will be smaller than that of India in each age group up to 35 years, as a result of a more rapid fertility decline since 1970 (a total population of 1.415 billion in China and 1.462 billion in India). Only at the older ages will the Chinese population be much greater than that of India. Between 1950 and 2025 the population of India has almost quadrupled, while that of China has increased by a factor of 2.6, and in 2022 India has surpassed China in demographic dimensions.

It is too soon to make a historical evaluation of the demographic paths undertaken by the two Asian giants. The rapid deceleration of demographic growth in China has probably made a relevant contribution to the spectacular economic development since the 1970s, but the country will have to be ready to absorb the shock of rapid aging in the coming decades as well as the political heritage of a coercive regime. On the contrary, India's sustained population growth has probably been an obstacle to the modernization of the country and worsened many social problems, although it has not impeded the acceleration of economic growth and may spare the country the shock of violent changes in the age structure. Which of the two countries has followed a better course is a matter of debate, but this must also include – besides the demographic factor – complex ethical, political, and economic considerations.

5.6 Fertilia and Sterilia

In the tropical region of a large continent lie the two bordering lands of Fertilia and Sterilia, which have in common a primarily agricultural economy situated in the more temperate highlands. Sterilia has an outlet on the sea where its principal city is found. It has for centuries been a center of maritime commerce and trade with countries near and far, including a former colonial power. Sterilia's population, especially that in the coastal region, is ethnically mixed as a result of the several currents of immigration that have peopled its shores. Fertilia, on the contrary, landlocked and

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extending to the interior of the continent, is characterized by ethnic homogeneity and a traditional culture. Politically, it is dominated by an upper class of large landowners, and contact with the outside world is minimal. At the time of decolonization, which occurred contemporaneously in the two countries, the two populations were about the same size and had similar demographic characteristics: fertility was high and uncontrolled and mortality, though high by Western standards, had nonetheless declined considerably thanks to the introduction of penicillin and the elimination of malaria by DDT spraying in the colonial era. As a result, both countries had high rates of growth, between 2 and 3 percent. Independence brought a coalition backed by the large landowners to power in Fertilia, while the merchant class gained hegemony in Sterilia. In addition to trade liberalization, one of the first political acts in Sterilia was the initiation of a vigorous family planning program, spread throughout the country by a system of internal communications and supported by foreign investment. A trained corps of personnel and a mobile network of consultants were quickly established. Other measures included liberalized abortion and sterilization, subsidies for contraceptives, and incentives for participation in the program. We shall probably never be able to determine whether this program was actually the cause of the profound changes in reproductive behavior that followed or else simply accelerated a transition already on the verge of initiation. In either case, fertility declined quickly, soon reaching replacement levels. By comparison, the more traditional government of Fertilia, influenced by fundamentalist religious groups and ruling a population little exposed to foreign contact and trade, only formally recognized the UN directive to respect the right of every couple to decide how many children it wanted. In spite of pressure from the ex-colonial power, which provided considerable economic aid, no active family planning policy was initiated and, if anything, the government blocked similar programs advanced by private concerns. Birth control spread slowly and, 30 years after independence, the women of Fertilia bore on average two children more than those of Sterilia.

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These two policies have affected the demographic growth and economic development of these countries very differently. The demographic consequences include divergent rates of growth and age structures. Equally populous at the time of independence (which, however, was referred to as the Revolution in Sterilia), the ratio was 1.4:1 after 30 years (in favor of Fertilia naturally) and 2:1 after 60 years. In Sterilia, the population under the age of 15 years accounted for 42 percent of the total at the time of the Revolution; after 30 years, this figure had dropped to 27 percent, and after 60 years to 21 percent (at which time the growth rate was about zero). In Fertilia, on the contrary, the proportion of age under 15 years, equal to that of Sterilia at the time of independence (42 percent), declined more slowly, representing 38 percent of the total after 30 years and 30 percent after 60 years. At the latter date, population growth was still running at about 1.5 percent per year. In contrast, 60 years after the Revolution, the proportion of the population over 65 years in Sterilia (12 percent) was double that in Fertilia.

Differences in economic development have been equally significant. The high rate of growth in Fertilia has led to the quadrupling of the working-age population with an attendant high level of agricultural underemployment. Strong currents of migration flow primarily toward the capital city, which has become a sprawling megalopolis crowded with impoverished masses. Given the still large average family size, the average Fertilian's small income goes almost entirely to obtaining the necessities of survival, leaving little for savings; this is to the detriment of investments, which only barely keep pace with population growth. The meager financial resources commanded by the government have been insufficient to expand infrastructure and services. In particular, the spread of education has been slow: in spite of the (slow) fertility decline, the school-age population, between the ages of 5 and 15 years, has tripled in the 60 years considered. The combination of a slow rate of agricultural development and a high rate of urbanization has transformed the country from an exporter of tropical products to a net importer

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of foodstuffs. Lack of investment has inhibited the development of its fragile manufacturing industry, and the country has accumulated an enormous foreign debt. The growth of per capita income has been small, and the absolute number (if not the percentage) of the marginally poor and illiterate has increased dramatically.

Sterilia's recent history differs substantially from that of Fertilia. Fertility limitation has ensured that, during the 60 years since the Revolution, the size of Sterilia's school-age population has remained constant (as opposed to its tripling in Fertilia), which has enabled public monies to be used for considerable expansion and improvement of the education system. As a result, succeeding generations entering the labor market have been both smaller in number and better trained than in Fertilia. Labor force efficiency has increased rapidly, fueling development in both the traditional and modern sectors of the economy. Birth control has also meant smaller families, so more rapid emancipation of women and the possibility for personal savings of those resources have no longer been completely absorbed by basic needs. Greater savings have allowed investments to outpace demographic growth, making infrastructure modernization, greater agricultural production, and economic diversification possible. Moreover, changes in age structure have notably reduced the dependency ratio (the number of nonproductive members of society – the old and the very young – per 100 productive members), and this too has favored economic development. This same process has proceeded much more slowly in Fertilia. Lower levels of population increase and urbanization and above all improved agricultural productivity have ensured that Sterilia remains a net exporter of foodstuffs, which has helped to finance the purchase of machinery for the development of the manufacturing industries. Per capita income has grown rapidly and, 60 years after the Revolution, Sterilia has half the population of Fertilia, a larger gross national product, and a standard of living envied by its neighbor.

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The preceding passage is an invention on the part of the author, but might be taken from the work of a historian attempting to describe and interpret the recent past of these two countries, also purely imaginary.[71] Analyses of this sort have been frequent over the decades since World War II, during which the population growth rate of developing countries has risen dramatically, making demographic increase a major contemporary concern. The contrast between Fertilia and Sterilia serves to illustrate the paths that the poorer nations have followed in recent decades or might follow in the near future. However, the above analysis, while fairly convincing in its general line of reasoning, is less so for the basic assumptions it makes.

The first assumption is that a rapidly growing population inevitably leads to diminishing returns from labor and other factors of production and so to that capital dilution which, all things being equal, increases poverty; according to this formula, the slower population growth of Sterilia is clearly an advantage. The second assumption is that smaller families lead to the creation of savings and so greater investments, another point in Sterilia's favor. The third assumption is that slower population growth means greater workforce efficiency and therefore greater productivity. According to the fourth assumption, factors of scale related to demographic size are of little relevance and so do not benefit the more rapidly growing population. Similarly, population increase is assumed to have no positive effect on technological progress. In short, success at limiting demographic growth must be a determining factor of economic development. It should follow, then, that demographic growth and economic development since the 1960s or 1970s are related inversely to one another.

This final point, which sums up the previous ones, can be put to a first-order test. It is a fairly crude test, analogous to that made in Section 4.7 for the Western countries, comparing population growth rates and per capita income in 28 poor countries.[72] I need not repeat here the cautions I have already expressed at some length regarding this exercise.

The connection between population growth and development is probably blurred by a series of factors that tend to cancel one another

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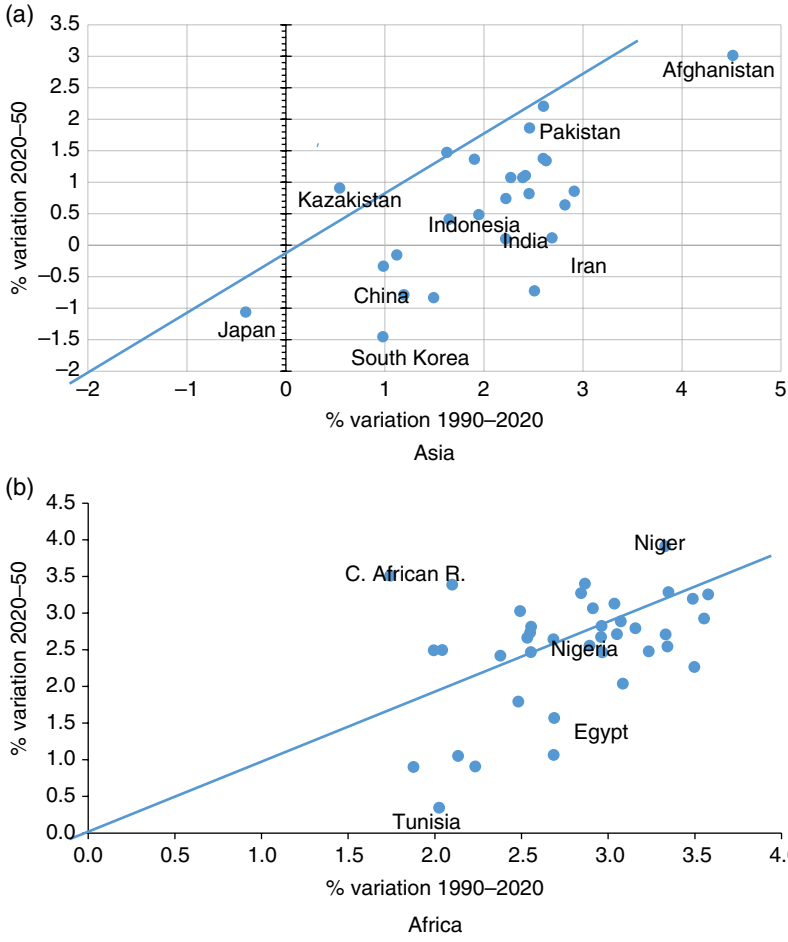


Figure 5.10 Past and future labor force growth in: (a) Asia and (b) sub-Saharan Africa in working age in Asia and in Africa (percent yearly variation).

out. One is led to think that demographic growth has probably not been an insurmountable obstacle to increasing well-being and that, for diverse and complicated reasons, those factors that seemed so clearly at work in Fertilia and Sterilia have in fact operated much less clearly in recent decades.[73] I shall turn to this problem.

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5.7 Explaining a Paradox

Considerable debate has arisen over the fact that the model relationship between demographic growth and economic development underlying the examples of Fertilia and Sterilia is difficult to verify. As a result, scholars have sought both empirical verification for the theoretical premises on which the model is based and explanations for the lack of confirmation.[74] It was in the 1980s, when it became universally accepted that population growth must be controlled and that fertility control was considered a goal in and of itself and not subordinate to others, that the existence of an unambiguous relationship between the phenomena of demographic and economic growth also began to be questioned.

Returning to the heart of the problem, faster demographic growth – that of Fertilia as compared to Sterilia – is considered harmful to economic growth for a series of reasons. In simplified form, they are as follows:

1) The stock of physical capital (that is, capital goods such as tools, machinery, infrastructure, and buildings) per worker declines, or is "diluted," by the addition of new units of population. As a result, per capita production also declines.[75] Fertilia, growing more quickly than Sterilia, suffers from this handicap, which could be overcome if its rate of investment (the proportion of GDP dedicated to investment) were to increase. This increase, however, can only come about if a smaller proportion of income is devoted to consumption, which in turn is linked to the standard of living. Poor countries, to reduce the gap with wealthier ones, would need to expand their investments at a rate higher than that of the developed ones. In 2022, the formation of fixed capital (machinery, vehicles, and buildings necessary for production) amounted to a few thousand dollars per active population in poor African countries, where the active population is bound to increase between 10 and 30 percent in the coming decade. In the poor countries of Asia (India, Pakistan, and Thailand), the per capita value of new fixed capital is double or triple that of the African countries, and their active population is expected to

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decline or only marginally increase in the coming decade. This disparity signals how impervious will be development in the African region. The problem for the poor countries (especially those with high rates of natural increase) is made worse by the fact that in the future their workforces will expand at rates far above those of the rich countries and so, in order to reduce the gap between them, they must not only match but also exceed the rich country rate of investment increase. As far as variation in the labor force is concerned, prospects in less-developed countries vary considerably. Figure 5.10 compares the annual rate of increase of the labor force in Asia and sub-Saharan Africa in 1990–2020 with the same rate expected for 2020–50. For the majority of Asian countries (Figure 5.10a) future rates are well below past rates, while in almost half of the sub-Saharan countries (Figure 5.10b), future rates will be higher than past rates. Moreover, the average rate of increase of the labor force in Africa in the next 30 years will be much higher than in Asia (+2.5 against 0.6 percent). These differentials will no doubt have a considerable impact on future economic development.[76]

2) When natural resources – especially land and the water necessary to make it productive – are scarce or expensive, they too are affected by excessive population growth, suffering the progressively diminishing returns that have already been discussed at length (see Section 3.1). The agricultural population of working age continues to increase rapidly in many Asian countries already characterized by very high densities of agricultural population, a high level of landlessness, and small average holdings among the landed. As the rural population increases, "the implications will be grim. Arable land per farmer will decline even further, lowering labor productivity and income, increasing the incidence of rural poverty and exacerbating inequality."[77]
3) Human capital, as expressed by the physical and technical efficiency of the population, is subject to rules similar to those applying to physical capital. If, for example, Fertilia and Sterilia invest the same percentage of GDP in social programs (education and public health) at the beginning of their demographic transitions, then the subsequent and growing difference in the size of the

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school-age populations will be such that while in Sterilia education can expand and improve without increasing this percentage, the same can only occur in Fertilia if the percentage increases (at the expense naturally of other investments or consumption).[78] Increased education has beneficial effects on development, and this effect is particularly strong with the transition from illiteracy to primary education.[79]

4) Rapid growth may create a general distortion of public spending. As literacy and public health are generally given priority, a rapidly growing population may require a larger portion of the overall budget to be set aside for these needs than is the case for a population growing more slowly.[80] Fewer resources remain for investment in fixed capital, generally considered more profitable in the short or medium term, and so growth is less than it would otherwise be.
5) Rapid demographic growth also inhibits the creation of family savings. These in turn represent a significant portion of the private savings that determine the resources available for investment.[81] Rapid growth implies high fertility and large families. As a result, family income is devoted primarily to satisfying basic needs, leaving only a modicum for savings. As the number of children per family declines, a larger percentage of family resources becomes available for savings, and so for investments. The link to economic growth is clear.
6) Several of the previous points suggest that population increase (or increase of the absolute dimensions of the economy) does not generate positive factors of scale. In other words, a larger population would not create better conditions for the use of the factors of production (natural resources, capital, and labor).[82]

To verify the above points (which are simplifications of much more complex theories), we should be able to detect a negative relationship between demographic growth and economic development over the past decades. If we have been unable to do so, it is because the diverse situations of the poor countries and their often stormy political, economic, and social histories have altered, often in unexpected ways, the above mechanisms.

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Consider the investments in fixed capital that make an important contribution to development in poor countries: for the three decades following 1960, it has been estimated that about two-thirds of output growth was the result of increased input of capital as compared to one-quarter due to labor and one-seventh due to total factor productivity or technical progress. In industrial countries, the contribution of fixed capital in the same period was much lower and estimated at between one-quarter and one-third of total growth.[83] All things being equal, there should, in principle, exist a thinning effect on capital per worker in more rapidly growing populations.[84] According to the World Bank, the countries defined as "middle income," between 1990 and 2022, have increased the share of fixed capital from 23 to 32 percent of GDP, while in the whole of Latin America, North Africa-Middle East, and sub-Saharan Africa the same ratio has remained stable around 20 percent, and the capital dilution effect of population growth has been neutralized.[85]

With regard to fixed natural resources, especially land, the agricultural expansion that has enabled the developing countries as a whole to increase agricultural production at a greater rate than population is primarily due to increasing yields (the "Green Revolution"), rather than the cultivation of new lands.[86] In fact, the introduction of Green Revolution technology in many areas has been aided by high population density, which favors infrastructure development and technology transfer.[87] In other areas, however, the scarcity of land and its high cost have created serious obstacles.[88]

Some studies have also cast doubt on the theory that rapid demographic growth alters the proportions of public spending, favoring "social investments," especially education, at the expense of investments in fixed capital. In many poor countries, rates of demographic growth have not affected the progress of literacy and education, nor have they distorted public spending to the detriment of investments in fixed capital. More economical use of available resources (for example, limiting teachers' salaries) has allowed for the realization of goals in spite of high demographic pressure.[89] In the period since 1980, an increased proportion of resources in many countries has been channeled to education.[90]

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With regard to the creation of savings, both theoretical and empirical considerations challenge the assumption that a rapidly growing population necessarily implies a lower rate of saving due to larger family size. Several possible mechanisms seem to neutralize this effect. The first mechanism is that adult labor intensity within the family does not remain fixed, but changes in response to changes in family size. A larger number of dependent children leads to intensification of productive activity (particularly in rural areas), an increase in resources, and so perhaps also of savings.[91] In his classic study of peasant economies, Chayanov noted a clear relationship between the number of dependants per worker and labor intensity in peasant families of Tsarist Russia. The intensity increased as families grew and declined as they shrank.[92] In the second place, there is a higher ratio of young workers (who save) to old or retired workers (who have negative savings) in a rapidly growing population, and this effect tends to balance out the negative impact on savings of a large number of dependent children.[93] Finally, family savings in poor countries come primarily from a few very rich families and so are little influenced by family size. As things stand, the numerous tests of the relationship between demographic growth (not to mention age structure, dependency ratio, and so forth) and the rate of savings have not yielded significant results. Opposing forces seem to neutralize one another, and it may also be the case that insufficient data play an important role in the inconclusiveness of results.[94]

The final point concerns possible economies of scale, which I have already discussed (see Section 3.5). Those who support the hypothesis of a negative correlation between demographic growth and economic development believe these to be nonexistent or at least irrelevant. Others, however, hold that population growth and increasing density have fueled the development of infrastructure (especially communications and transportation) necessary for economic development.[95] As mentioned above, in many countries agricultural development and the Green Revolution seem to be helped rather than hindered by higher demographic density, and so factors of scale, in a broad sense, seem to exercise a significant positive influence. One should also add the fact that the geographic situation of a country, its climatic and biopathological environment, its accessibility and natural conformation, and its endowment of primary

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resources, closely interact with the demographic and economic characteristics.[96]

The problems raised by consideration of the relationship between population and economy are intricate and involve variables whose interaction and causal relationship with other factors are neither stable nor well understood. The above discussion may help to explain why the evolution of the relationship between population and economy in recent decades escapes simple theoretical schemes. The extreme adaptability of human behavior, both demographic and economic, in the face of external limitations confounds the simplifications of those who would like to translate this behavior into simple formulas for the sake of easy analysis. In addition, the helter-skelter progress of technology blunts, expands, and distorts relationships often taken for granted.

Nonetheless, the fact that a clear and direct relationship between demographic growth and economic development is not readily discerned does not mean that it does not exist or that it is ultimately unmeasurable. The conclusions reached by A. C. Kelley in his in-depth study of this problem are still relevant today:

> Economic growth (as measured by per capita output) in many developing countries would have been more rapid in an environment of slower population growth, although in a number of countries the impact of population was probably negligible, and in some it may have been positive. Population's adverse impact has most likely occurred where arable land and water are particularly scarce or costly to acquire, where property rights to land and natural resources are poorly defined and where government policies are biased against the most abundant factor of production – labor. Population's positive impact most likely occurred where natural resources are abundant, where the possibilities for scale economies are substantial, and where markets and other institutions (especially government) allocate resources in a reasonably efficient way over time and space.[97]

Therefore, between the demographic paths taken by Fertilia and Sterilia, the choice will generally be for that of Sterilia, though we should keep in mind that this choice may not always be a successful one.

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Notes

1 In this chapter I shall use the term "poor countries" for those countries frequently described as "less-developed" or "developing," and "rich countries" for those usually called "developed" or "more-developed." Rich and poor countries are of course abstract categories and serve primarily as a scheme of definition. The rich countries include the countries of Europe and North America, Australia, New Zealand, and Japan; by a considerable stretch of imagination, the countries of Eastern Europe are also included. Occasionally I shall use the term "Western countries" to refer to the countries of Western Europe and their projections in North America and Oceania, excluding Japan, which has a distinct demographic history. Among the "poor" or developing countries the reader will find countries, such as South Korea, with current high standards of living, but those have emerged from poverty only in the past two or three decades. For a comparative analysis of the demographic transition in the poor and rich countries, see D. S. Reher, "The Demographic Transition Revisited as a Global Process," *Population, Space and Place* 10 (2004). A good synthesis can be found in World Bank Group, *Global Monitoring Report 2015/16: Development Goals in an Era of Demographic Change* (Washington, DC, World Bank 2016).

2 The 28 countries considered are not in absolute terms the 25 most populous countries of the poor world, but rather the most populous from each continent: 9 in Africa (Democratic Republic of the Congo, Egypt, Ethiopia, Kenya, Morocco, Nigeria, South Africa, Sudan, and Tanzania), 11 in Asia (Bangladesh, China, India, Indonesia, Iran, Pakistan, the Philippines, South Korea, Thailand, Turkey, and Vietnam), and 8 in America (Argentina, Brazil, Chile, Colombia, Cuba, Mexico, Peru, and Venezuela). The combined population of these countries represents well over four-fifths of the total population of the poor countries. From the point of view of their history and demographic growth, Argentina and Chile have more in common with the European countries (of which they are "projections") than with other Latin American countries. The exclusion of small countries, such as, Singapore, Mauritius, Costa Rica, and many others, eliminates interesting cases of precocious transition, processes which, however, are in part favored by their small dimensions or insularity.

3 On the phases of the mortality transition in the various continents, see J. C. Riley, "The Timing and Pace of Health Transition Around the World," *Population and Development Review* 31:4 (2005).

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4 United Nations, *World Population Prospects. The 2024 Revision* (UN, New York, 2024). M. Mahy, *Childhood Mortality in the Developing World: A Review of Evidence from the Demographic and Health Surveys*, DHS Comparative Reports, no. 4 (ORC Macro, Calverton, MD, 2003).

5 These figures are calculated assuming that mortality beyond the age of 5 years for these "new survivors" is that of the respective areas.

6 ORT or oral rehydration therapy. These are simple packets, the contents of which are soluble in water and contain the essential salts lost by the infant suffering attacks of diarrhea; the afflicted baby, by drinking this solution, is able to make up for these losses. It is a therapy easily administered by the child's mother or another family member. When this is too expensive, a simple sugar–salt–water solution can provide enough of the fluids, calories, and salt an infant needs to recover from diarrhea. On childhood pathologies and their care, see R. Y. Stallings, *Child Morbidity and Treatment Patterns*, DHS Comparative Reports, no. 8 (ORC Macro, Calverton, MD, 2004).

7 The countries represented in Figures 5.4 and 5.7 are listed in note 2.

8 These include not only the smallpox vaccine – smallpox virtually disappeared at the end of the 1970s – but also vaccines against measles, whooping cough, neonatal tetanus contracted at birth as a result of umbilical cord infection, polio, tuberculosis, and diphtheria, which claim millions of victims. See "Immunizing the World's Children," *Population Reports*, series L (Mar.–Apr. 1986).

9 S. A. Meegama, "The Mortality Transition in Sri Lanka," in *Determinants of Mortality Change and Differentials in Developing Countries* (United Nations, New York, 1986).

10 W. H. Mosley, "Will Primary Health Care Reduce Infant and Child Mortality? A Critique of Some Current Strategies with Special Reference to Africa and Asia," in J. Vallin and A. D. Lopez, eds., *Health Policy, Social Policy and Mortality Prospects* (INED/IUSSP, Ordina, Liège, 1985).

11 WHO–UNICEF, *Alma Ata 1978: Primary Health Care* (WHO, Geneva, 1978); WHO, *World Health Report 2003: Shaping the Future* (WHO, Geneva, 2003, Chapter 7).

12 A. Sen, "Health in Development," *Bulletin of the World Health Organization* 77 (1999), p. 8; A. Sen, "The Economics of Life and Death," *Scientific American* (May 1993), pp. 18–25.

13 This is the point of view expressed in J. C. Caldwell, "Routes to Low Mortality in Poor Countries," *Population and Development Review* 12:4 (1986).

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14 Caldwell, "Routes to Low Mortality in Poor Countries," pp. 209–11. On mortality trends in developing countries, see also R. R. Soares, "On the Determinants of Mortality Reductions in the Developing World," *Population and Development Review* 33:2 (2007); R. Kuhn, "Routes to Low Mortality in Poor Countries Revisited," *Population and Development Review* 36:4 (2010); United Nations, *World Mortality* (UN, New York, 2020).

15 In fact, in some countries of sub-Saharan Africa there has been clear evidence of an increase in fertility – an increase explained by shorter breastfeeding and so reduced birth intervals (see later in this section), and by improved sanitary conditions, which have reduced the incidence of certain infectious diseases causing sterility or reduced fecundity. The UN, for example, estimates that the *TFR* for Western Africa increased from 6.7 to 6.9 between 1950–5 and 1975–80 and that of Eastern Africa from 6.7 to 7. M. Garenne, *Fertility Changes in Sub-Saharan Africa*, DHS Comparative Reports no. 18 (ORC Macro, Calverton, MD, 2008). For a general appraisal of fertility trends, see United Nations, *World Fertility Report 2013. Fertility at the Extremes* (UN, New York, 2014); United Nations, *World Fertility Report 2019* (UN, New York, 2020); J. Bongaarts and D. Hodgson, "Fertility Trends in the Developing World, 1950–2020," in: *Fertility Transition in the Developing World* (Cham: Springer International Publishing, 2022)

16 Naturally, this analogy is only applicable in a general sense, and the attendant circumstances were very different. Mortality decline in Europe came about more gradually and so allowed a gradual adjustment of fertility. Moreover, even in high-fertility areas birth control was practiced by a significant sector of society, such as the urban classes and the well-educated. On the contrary, current developments in many less-developed countries show that fertility may fall below replacement replicating the recent history of the rich countries. See D. S. Reher, "Long-Term Population Decline, Past and Future," XXV International Population Conference, Tours, 2005.

17 DHS surveys have been taken since 1986 in a large number of countries of the developing world on samples of women of reproductive age ranging in size from 2,000 to 30,000. The survey questionnaire includes questions on demographic characteristics, fertility history, contraceptive use, and health of women and children, as well as many socioeconomic variables. Several countries have had more than one survey, and in many cases samples of men and husbands have also been included. See DHS + Dimension, *Newsletter* 3:1 (2001), 3:7 (2005). Sponsored by United States Agency for

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International Developments (USAIDs), several hundred surveys have been taken in almost 100 countries.

18 G. Mboup and T. Saha, "Fertility Levels, Trends and Differentials," *Comparative Studies* 28 (Macro International, Calverton, MD, 1999). On the slow fertility transition in Africa south of the Sahara, see A. Romaniuk, "Persistence of High Fertility in Tropical Africa," *Population and Development Review* 7:1 (2011).

19 On the general characteristics and principal results of the WFS, see WFS, *Major Findings and Implications* (WFS, London, 1984). The surveys, normally carried out on groups of 3,000–10,000 women of reproductive age, comprised 41 developing countries and 21 developed countries; most were conducted in the second half of the 1970s.

20 United Nations, *Fertility Behavior in the Context of Development. Evidence from the World Fertility Survey* (UN, New York, 1987), pp. 78, 82; United Nations, *First Marriage: Patterns and Determinants* (UN, New York, 1988).

21 United Nations, *Fertility Behavior*, p. 78. See also P. Xenos and S. A. Gultiano, *Trends in Female and Male Marriage and Celibacy in Asia*, in "Papers of the Program in Population," no. 120 (East–West Center, Honolulu, 1992); C. Westoff, A. K. Blanc, and L. Nyblade, *Marriage and Entry into Parenthood*, DHS Comparative Studies no. 10 (1994).

22 Mboup and Saha, *Fertility Levels*; J. Bongaarts, "The Fertility Impact of Changes in the Timing of Childbearing in the Developing World," Working Paper, no. 120 (Population Council, New York, 1999); "World Marriage Patterns 2000," *Population Newsletter* (December, 1999); United Nations, *World Population Monitoring. Reproductive Rights and Reproductive Health* (UN, New York, 2003), pp. 133–5. United Nations, *World Fertility Report 2013*, pp. 37–41. United Nations, *World Marriage Data*, 2019.

23 W. P. Mauldin and S. J. Segal, "Prevalence of Contraceptive Use: Trends and Issues," *Studies in Family Planning* 19 (1988), p. 340. Of course these measures only give a very general picture, as the effectiveness of the various contraceptive methods depends in part on the method itself (the pill and IUD are highly effective while coitus interruptus and rhythm are not) and in part on the motivation and assiduousness of the couple. M. Garenne, "Trends in Marriage and Contraception in sub-Saharan Africa: A Longitudinal Perspective on Factors of Fertility Decline" (DHS Analytical Studies No. 42. ICF International Rockville, Maryland, 2014).

24 United Nations, *Fertility Behavior*, p. 133.

25 United Nations, *World Contraception Use Data 2022* (World Contraceptive Use | Population Division [un.org]).

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26 The World Bank, *World Development Report 1984* (Oxford University Press, New York, 1984), pp. 115–16.

27 The fertility-reducing impact of the increase of age at marriage is relatively modest and gradual, as is shown by the experience since the 1940s.

28 R. D. Lee and R. A. Bulatao, "The Demand for Children: A Critical Essay," in R. D. Lee and R. A. Bulatao, eds., *Determinants of Fertility in Developing Countries*, vol. 1 (Academic Press, New York, 1983).

29 For differing interpretations regarding the cost of children, see J. C. Caldwell, "Direct Economic Costs and Benefits of Children" and P. H. Lindert, "The Changing Economic Costs and Benefits of Having Children," both in Lee and Bulatao, *Determinants of Fertility*.

30 The World Bank, *World Development Report 1984*, p. 52.

31 M. Cain, "Risk and Insurance: Perspectives on Fertility and Agrarian Change in India and Bangladesh," *Population and Development Review* 7:3 (1981). As to parents' expectations concerning their own children's support in old age: A. I. Hermalin and Li-Shou Yang, "Levels of Support from Children in Taiwan: Expectations Versus Reality," *Population and Development Review* 30:3 (2004).

32 This really only applies to developing countries. In the West almost the entire fertility transition took place by means of traditional methods like coitus interruptus. In fact, in most of the West the distribution and advertisement of birth-control methods was illegal until after World War II.

33 United Nations, *Report of the United Nations World Population Conference* (UN, New York, 1975).

34 United Nations, *Report of the International Conference on Population, 1984* (UN, New York, 1984).

35 United Nations, International Conference on Population and Development, *Programme of Action*, Cairo, 1994. On the international action after 1994: United Nations, *Review and Appraisal of the Progress Made in Achieving the Goals and Objectives of the Programme of Action on the International Conference on Population and Development* (UN, New York, 2004); UNFPA, *ICPD at 15 – Report. Looking Back, Moving Forward* (UN, New York, 2011); UNFPA, *Fulfilling the ICPD Progress* (UNFPA, New York, 2019).

36 J. Bongaarts, *The Role of Family Planning Programs in Contemporary Fertility Transition*, Working Paper, no. 71 (Population Council, New York, 1995).

37 On unmet need, see J. Bongaarts and J. Bruce, *The Causes of Unmet Need for Contraception and the Social Content of Services*, Working Paper, no. 69 (Population Council, New York, 1994); C. F. Westoff and A. Bankole,

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Unmet Need: 1990–94, DHS Comparative Studies no. 16 (Macro International, Calverton, MD, 1995). United Nations, *World Fertility Report 2013*, pp. 42–3.

38 P. W. Mauldin and J. A. Ross, "Family Planning Programs: Efforts and Results," *Studies in Family Planning* 22:6 (1991).

39 J. Bongaarts, *The Fertility Impact of Family Planning Programs* (Population Council, New York, 1993), p. 4.

40 Of the 46 countries, 22 are from sub-Saharan Africa, 10 from Asia and North Africa, 10 from Latin America, and 4 from Europe.

41 For an effective criticism of the conventional view and a demand-oriented approach, see L. H. Pritchett, "Desired Fertility and the Impact of Population Policies," *Population and Development Review* 20:1 (1994).

42 Prevalence of contraception is defined as the percentage of currently married women, aged 15–49 years, currently using any method. *WTFR* is close, but not identical, to the concept of "desired fertility." This can be assessed on the basis of answers to the DHS survey question: "If you could go back to the time you did not have any children and could choose exactly the number of children to have in your whole life, how many would that be?" Subtracting from the number of actual births those births in excess of each woman's desires, a desired total fertility rate (*DTFR*) is computed. Answers to the question on desired fertility are obviously influenced by the mothers' rationalization of past behavior. Alternatively, wanted fertility can be estimated indirectly using answers to the question about desires for future births. This answer refers to the future and not to the past and is not biased by ex-post rationalization. Past births to women who want another child are classified as wanted and, with other adjustments, a measure *WTFR* is estimated. For desired fertility, see C. Westoff, "Reproductive Preferences: A Comparative View," *Demographic and Health Surveys*, *Comparative Studies*, no. 3 (IRD/Macro Systems, Columbia, MD, 1991). For the concept of wanted fertility, see J. Bongaarts, "The Measurement of Wanted Fertility," *Population and Development Review* 16:3 (1990). For a discussion of the various measures, see Pritchett, "Desired Fertility."

43 Defined as $(TFR - WTFR)/TFR \times 100$.

44 Pritchett, "Desired Fertility," p. 15. For a contrary view, see B. Feyisetan and J. B. Casterline, *Fertility Preferences and Contraceptive Change in Developing Countries*, Working Paper, no. 130 (Population Council, New York, 1999).

45 P. Demeny, "Policies Seeking a Reduction of High Fertility," in United Nations, *Population Policies and Programmes* (UN, New York, 1993).

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70 Coale, "Population Trends," p. 1,761.

71 I am indebted to a well-known scholar both for the idea and the names of Fertilia and Sterilia. See J. E. Meade, "Population Explosion, the Standard of Living and Social Conflict," *Economic Journal* 77 (1967). The example of the two islands of Fertilia and Sterilia is found on pp. 239–42, together with many incisive observations about the relationship between demographic growth and economic development. My attempt to find alternative names to Fertilia and Sterilia and so avoid the above plagiarism met with no success.

72 For the list of countries see note 2.

73 In an overview of the relationship between population and development, Robert Cassen wrote: "Altogether simple economics seems to suggest that countries with faster population growth will in the long run end up with lower per capita income . . . But neither theory nor econometrics has so far been able to demonstrate this relationship beyond doubt." See R. Cassen, "Overview," in R. Cassen, ed., *Population and Development: Old Debates, New Conclusions* (Transaction Publishers, New Brunswick, NJ, 1994), pp. 10–11. For Ansley Coale, the lack of association between population and economic growth is due to the banal fact that population growth is (migration aside) the difference between birth and death rates, and both of these have strong inverse relations with the gradient of development. As a consequence, the same rate of population growth can occur at different levels of development, blurring any visible relation with the speed of economic growth. See A. Coale, "Population Trends and Economic Development," in J. Menken, ed., *World Population and the U.S. Policy: The Choices Ahead* (W. W. Norton, New York, 1986).

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80 Coale and Hoover, *Population Growth*, p. 285.

81 Coale and Hoover, *Population Growth*, p. 25.

82 With regard to the minimal relevance of factors of scale in the manufacturing industries, see National Research Council, *Population Growth*, p. 52.

83 The World Bank, *World Development Report 1991* (Oxford University Press, New York, 1991), p. 45. See also E. F. Denison, *Trends in American*

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