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Chapter 15

DEMOGRAPHY

A Development Perspective

Richard P. Cincotta

Turning the attention of policymakers to demography's role in development has never been easy. It is not surprising; the pace of demographic change is typically slower and its effects are less obvious than an upsurge in armed conflict or an abrupt political reversal, which are more commonly the subjects of televised interviews and ambassadorial démarches. That said, one cannot help but notice the increasing frequency at which articles on demographic topics have appeared lately in influential foreign policy journals and magazines.[1] Why has there been an upsurge in interest?

Perhaps the conclusions of the past two decades of research by economic and political demographers—which this chapter synthesizes—caught policymakers by surprise. As the world's states diverged demographically and as demographic data became increasingly detailed and accessible, researchers focused less on the effects of population-growth-driven depletion and scarcities of resources (associated with the neo-Malthusian paradigm) and more on looking for influences of the population's age structure (the distribution of residents by age) on a state's economic, social, and political ecology. This is a new development agenda concerned with states that are "demographically cresting" as well as with the effect of this "cresting" on those states' future growth and prosperity.

Three component assumptions are embodied in the neo-Malthusian paradigm. First, proponents assume that a rapid rate of population growth in states with underdeveloped institutions and insufficient infrastructure will outpace economic growth, job growth, and the development of vital services and infrastructure. Second, proponents assume that high population densities will translate into high aggregate demand for renewable and nonrenewable natural resources, leading to economically detrimental resource scarcities, including food insecurities and the overloading of natural "sinks" for waste absorption. These scarcities, proponents assert, slow development and encourage aid dependency in less-developed countries. And third, proponents of this paradigm assume that the developing world's renewable natural resource base (its stock of natural capital)—composed of forests and natural rangelands, agricultural soils, fisheries, watersheds, and endemic species—will be vastly depleted by overexploitation, overmanipulation, pollution, and land-use change, much of these due to the human population's growing aggregate requirements for basic levels of food, energy, and shelter and its expanding demand for productive livelihoods.

Proponents of the neo-Malthusian paradigm, many of whom were academics in the biological sciences, were criticized for their lack of understanding of the ability of markets and international trade to mediate resource distribution, their lack of faith in institutions, and their environmental sentimentality. The most vocal opponent, Julian Simon, took the diametrically opposite view of neo-Malthusians. For Simon, continued population growth drove ingenuity and produced a larger pool of creative individuals. Resource scarcities, he argued, would be mediated by the marketplace, by substitution, and by technological change.[2]

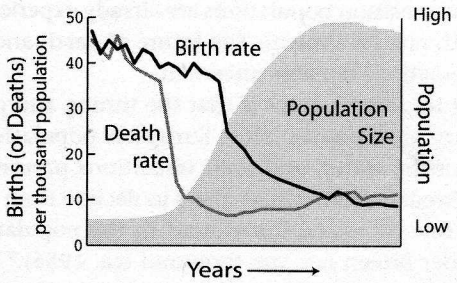
By the early 1980s, proponents of this paradigm—both in academia and in the development donor community—felt confident that developing economies were showing economic and social strains related to neo-Malthusian effects. In response, in 1982, the US Agency for International Development's (USAID) Office of Population commissioned the National Academy of Science's Committee on Population (a nongovernmental body in Washington, DC) to organize a study through the US National Research Council (NRC) to use available data to evaluate the extent of rapid population growth's effects on the economic development of less-developed countries.

Published in 1986, the NRC study considerably dampened academic support for the neo-Malthusian paradigm.[3] In the NRC panel's view, rapid population growth's net effect on developing economies, in aggregate, was ambiguous. Slowing population growth, the authors stated, would likely ease rates of degradation of certain renewable natural resources and make it easier to reduce income disparities between social classes. But the NRC report also recognized the mounting economic contributions of these countries' urban economies and improvements to their citizens' school enrollments and health status, despite high rates of population growth.

Would a fresh review of more recent economic research tell a different development story? Most economic demographers believe that it would because the review would dwell far less on population growth, density, and aggregate demand (the focus of neo-Malthusians) and would likely dedicate most of its pages to reviewing literature that assessed the dynamic influence of age structure (the focus of the Coalesian paradigm, named for demographer Ansley Coale) on economic, social, and political conditions (as this chapter does).[4] And it might be broader, covering not only the youthful age structures that persist in Africa and parts of Asia but also extending its discussion to population aging in the industrialized regions of the world.

This chapter reviews this ground by explaining what population age structures are, then illustrating the successional sequence through which they typically mature, and finally discussing their implication for development. The latter part of the chapter discusses the development implications of population density and growth. It introduces a nontraditional approach to dealing with this persistent quandary—the institutional perspective—and uses two critical population-growth-related development concerns as examples.

Figure 15.1 The Demographic Transition Showing Idealized Death Rate and Birth Rate Transitions and Relative Changes in Population That Result



Source: Richard P. Cincotta and Laurel Hummel, "Africa's Youthful Age Structure and Its Security Implications," in *Africa's Strategic Geography*, edited by Amy Richmond Krackowa and Laurel Hummel, 257–82 (Carlisle, PA: US Army War College, 2009).

THE DEMOGRAPHIC TRANSITION

Two hundred and fifty years ago, the world's collection of states, ethnic federations, and empires probably looked very similar to each other in the way their populations were distributed by age. Reconstructed age structures from English records from the mid-sixteenth century until the mid-nineteenth century depict a series of moderately youthful societies in which, on average, 60 percent of the population was under thirty years of age and about 5 percent were over age sixty-five.[5] England's population age structure grew even more youthful during the early decades of the nineteenth century.[6]

Today, age structures range from extraordinarily youthful populations—more youthful than eighteenth or nineteenth century Europe ever experienced—to populations that are older and longer-lived than was ever thought possible by the actuaries and tax collectors of those times. In Niger, the Palestinian Territories, Afghanistan, and Uganda, people under thirty years of age make up more than 70 percent of all residents while those aged over sixty-five—the seniors—comprise between 2 percent and 4 percent of the populace. On the other side of today's age-structural spectrum are the populations of Japan and Italy, where under-thirties now comprise less than 30 percent of the population and 20 percent of all residents are seniors.

This is what is called the demographic transition. During this transition, death rates and birth rates are driven downward by three interrelated and sequential trends (figure 15.1). First, childhood death decreases, lowering the overall death rate (annual deaths per total population). Later—decades later, in some cases—the birth rate (annual births per total population) begins to decline.[7] The decline in childhood mortality (assumed by the mortality curve) and the decline in maternal mortality that typically accompany declining fertility boost average life expectancy throughout the middle of the transition. In late transition, death rates must rise as the elderly, who risk mortality from natural causes and chronic diseases of old age, assume a larger proportion of the population.

Historically, declines in the death rate have always preceded declines in the birth rate. However, the pace, timing, and length of these component transitions have varied. Some posttransition populations are already experiencing a death rate that exceeds their birth rate (as shown). The future of death and birth rate trends in post-transition populations remains uncertain.

Perhaps the most important point is that the timing and pace of the demographic transition vary enormously. Most European populations started much earlier than the rest of the world, and their transitions proceeded more slowly. For example, it took Sweden about ninety years to decline from a birth rate above thirty-five births per one thousand individuals in the population (ca. 1865) to a rate that settled under fifteen per one thousand (ca. 1955).[8] In South Korea, a similar decline took thirty years (1965 to 1995), a pace that Iran is likely to match as well.[9] By contrast, the birth rates of the populations of Niger and Afghanistan have only begun to descend from levels greater than fifty births per one thousand.

The principal sources of state-level population growth are the wide gaps between birth and death rates that normally occur during the early and middle stages of the demographic transition. Today the gap between birth and death rates are widest in sub-Saharan Africa and in parts of South and Central Asia. Although the gaps between these rates are narrowing elsewhere and have actually gone negative in Japan, Russia, and a few European states, UN demographers calculate that the global population of 6.9 billion individuals in 2010 is projected to grow to between 8 billion (the low-fertility variant projection) and 10.5 billion (high-fertility variant projection) by 2050.[10] In the low projection, world population will peak between 2040 and 2045 and then begin to decline.

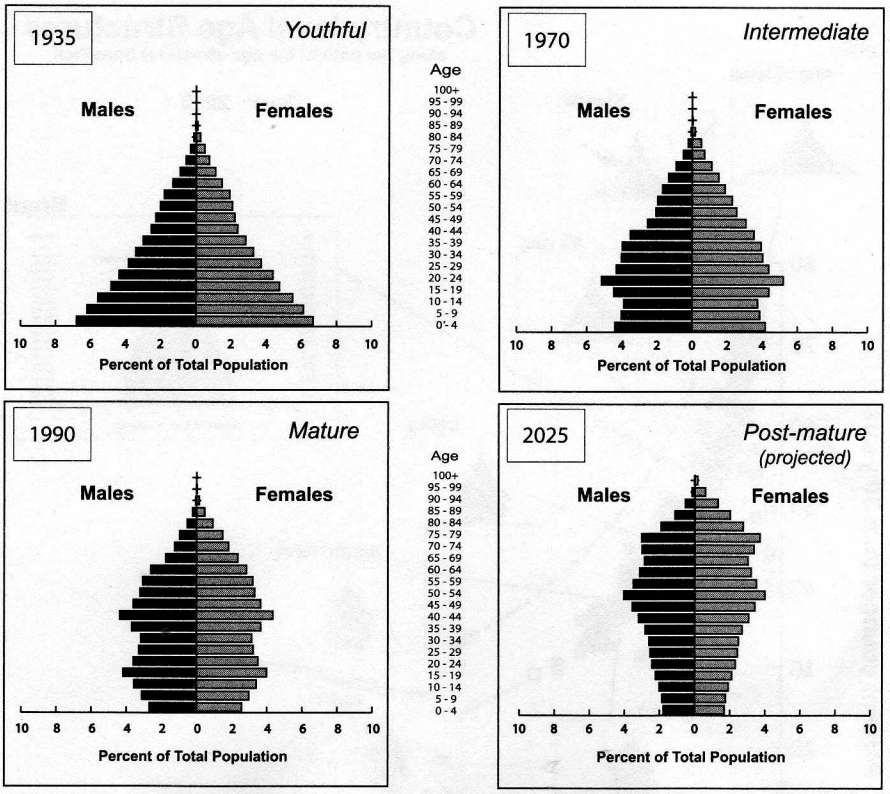
Because of the current high variation in fertility, this growth increment will be distributed unevenly across the world's regions. Today's poorest regions are experiencing the most rapid growth. Of the additional population projected to accumulate between 2010 and 2050, 40 percent is expected to reside in sub-Saharan Africa and another third in South and Central Asia. Demographic changes are only adding to the development challenges that these regions face.

THE AGE-STRUCTURAL TRANSITION

The age-structural transition is a process driven by a state's progress through the demographic transition. In this secondary transition, age structures pass through a predictable successional sequence of distributions—from a high-fertility youthful distribution (a median age of fifteen to twenty-five years) to an intermediate distribution (twenty-five to thirty-five years) and then to a mature population (thirty-five to forty-five years). States that sustain below replacement levels of fertility over an extended period will most likely pass into a postmature age structure (forty-five years or higher).

Compared with changes in population growth, shifts in age structure move relatively quickly. The abrupt decline of Japanese fertility after World War II, coupled with that country's virtual absence of immigration, fueled a rapid age-structural transition (figure 15.2). Japan's population is projected to reach a median

Figure 15.2 The Successional Sequence of Population Age Structures Experienced by Japan, 1935–2025



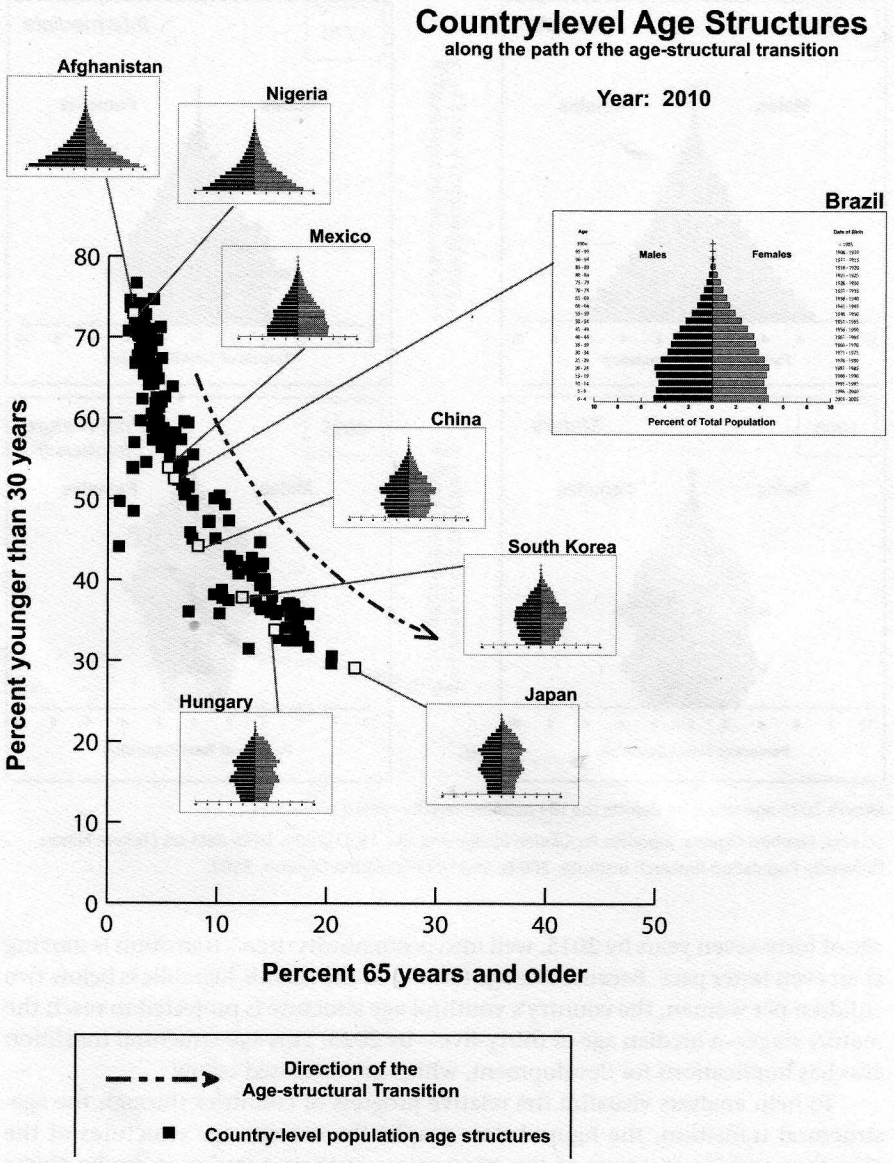
Japan's 2025 age structure depicts the UN medium fertility variant projection.

Sources: Naohiro Ogawa, *Japanese Population by Age and Sex, 1920–2000*, 1935 data set (Tokyo: Nihon University Population Research Institute, 2002); and UN Population Division, 2009.

age of forty-seven years by 2015, well into postmaturity. Iran's transition is moving at an even faster pace. Because average fertility in the Islamic Republic is below two children per woman, the country's youthful age structure is projected to reach the mature stage—a median age of thirty-five—by 2025. This age-structural transition also has implications for development, which are discussed below.

To help analysts visualize the relative progress of countries through the age-structural transition, the figure below graphs the current age structures of the world's countries in terms of the proportion of their population under thirty years of age and the proportion sixty-five years and older (figure 15.3). When graphed, most of the world's country-level populations line up fairly tightly along a smoothly sloping curve that ends in a cluster of three countries—Italy, Germany, and Japan—that are furthest advanced in the transition (although it is not clear why these three countries occupy this position). Those packed closely along this

Figure 15.3 The Positions of the Populations of the World's Countries along the Path of the Age-Structural Transition



The countries that are positioned distinctly to the left of the thick swath of points have age structures that are substantially influenced by immigration.

Source: UN Population Division, 2009.

curving pathway (referred to as transitional age structures) have shapes that have been primarily determined over time by the dynamics of the demographic transition, that is, by changes in fertility, childhood mortality, and longevity. Outlying populations—that is, those along the margins of the transitional pathway—have age structures that have been strongly influenced by other demographic forces (referred to as extratransitional influences), particularly international migration (for example, the oil-rich Gulf States with their large proportions of temporary labor migrants) and premature adult mortality (AIDS-related mortality in southern Africa, and male middle-age mortality in Russia and the Ukraine).

HIGH- AND LOW-FERTILITY TRAPS

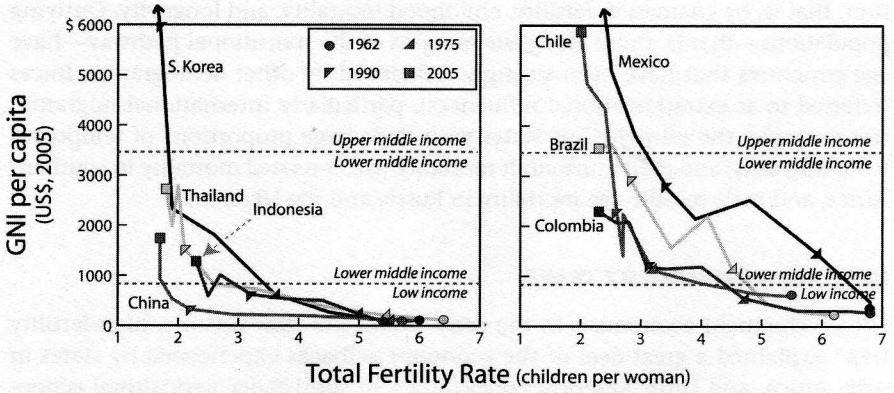
For development economists in the early 1960s, the "low-income, high-fertility trap" explained a great deal of the economic setbacks experienced by states in Asia, Africa, and Latin America. Poor couples in subsistence agricultural economies required children as farm laborers, to cushion risk as remittance generators, and ultimately as a source of old-age support. Under such conditions, their desire for large families, it was reasoned, created an educational and health burden that neither governments nor parents could afford. The failure to increase per capita investment in education—to build human capital—guaranteed the transmission of much of high levels of poverty into the next generation. Boosting income growth, most development economists agreed, provided the quickest and most actionable escape from this trap.[11]

Developments in East Asia, however, proved them wrong. In the late 1960s and early 1970s a handful of Asian governments decided to invest in programs to make modern contraception more widely available and affordable to low-income families.[12] The governments of South Korea, Taiwan, Thailand, Indonesia, and Singapore were the most successful at organizing these services and acquiring financial assistance, technical assistance, and training through programs supported by the USAID. By the time these family planning programs were first assessed, contraceptive use had begun to rise rapidly in the cities. More surprisingly, their use spread almost as fast when services were extended into the countryside. As a result, fertility in these East Asian states declined at unprecedented rates, leaving economic development to play catch-up.

Their economies did, in fact, catch up. Yet none of East Asia's economic tigers escaped from the World Bank's low-income category until their total fertility rate descended below 3.5 children per woman (figure 15.4). Thailand and Indonesia dropped below the three-child level before passing this development milestone, and China descended below two before it happened.[13]

However, not all developing countries followed East Asia's "fertility-first" income-fertility pattern. In Brazil and Mexico, and later in Botswana and South Africa, fertility and per capita income declined somewhat in tandem—a "tit-for-tat" pattern. And the tracks of other Latin American states, such as Chile and Colombia, fell between East Asia's "fertility-first" and Brazil and Mexico's "tit-for-tat" patterns. Interestingly, among the wave of recently developing states, the

Figure 15.4 The Income–Fertility Trajectories of Four East Asian and Four Latin American States



The trajectories of Chile and Colombia lie between East Asia's "fertility-first" income–fertility pattern and Mexico and Brazil's "tit-for-tat" pattern.

Sources: UN Population Division, 2009 (TFR); World Bank, 2008 (GNI per capita, World Bank Income Classes).

"income-first" income-fertility pattern, presupposed by many political scientists, was conspicuous for its absence.

By the 1980s, US population assistance programs had been joined by bilateral programs funded by the United Kingdom, the Netherlands, and the Scandinavian countries, and by efforts from the UN Population Fund. By the mid-1990s, fertility decline had taken root in North Africa, Iran, and Turkey, and in the southern states of India, leaving demographers confident that if a low-income, high-fertility trap did exist, it was weak. Development inertia, they were convinced, could be overcome with a mix of programs that provided increased access to, and information about, affordable contraception, broader maternal and child health care, and special efforts to increase the educational attainment of girls.[14] This paralleled the shift in development away from the focus on state-level poverty alleviation policies to an agenda that prioritized bottom-up projects focused on individuals.

During this decade, efforts to address persistent high fertility in sub-Saharan Africa became complicated by the spread of the human immunodeficiency virus (HIV), and by efforts to treat acquired immunodeficiency syndrome (AIDS) and to reduce HIV infection. Although the two public health efforts seemed complimentary, initial attempts to integrate services proved difficult. Nonetheless, demographers were encouraged by upticks in contraceptive use in South Africa, Botswana, Zimbabwe, Kenya, and Ghana, and many had become convinced that once fertility in these countries descended from very high levels, the trend would continue to descend smoothly until coming to rest at near-replacement levels (just above two children per woman).

By the early twenty-first century, however, health surveys were making it clear that the global transition was not going precisely as projected. In West, Central,

and East Africa, in parts of West and Central Asia, and in a few scattered populations elsewhere—including Timor-Leste, Yemen, and Gaza—fertility remained high or had stalled after a short period of decline.[15] It appeared that the high-fertility trap was real, and stubborn, and that its sources could be traced to the traditionally low status of women and to a cycle of protracted and reemerging ethnic and civil conflicts. Meanwhile, the United States, even as its support for AIDS treatment and HIV prevention in Africa vigorously expanded, shied away from condom promotion and backtracked on its prior commitments to international family planning.[16]

In Europe, another demographic topic was causing a stir. Since the 1970s, almost every country in Europe had experienced a decline to a fertility level below replacement. In Germany, Italy, and Russia, fertility declined to unprecedented lows—below 1.5 children per woman. Japan experienced the same trend. And in South Korea, Singapore, Hong Kong, and Taiwan, fertility dropped lower still—nearly to the one-child level.

The unexpected depth and persistence of low fertility stimulated considerable discussion. Several demographers suggested that these countries may be stuck in a low-fertility trap, and have proposed a model of economic and social conditions that reinforce a one-child-family norm.[17] They could be right. Despite the ongoing scramble to encourage childbearing with nationalist rhetoric, financial and child-care incentives, and programs that promote a more child-friendly environment, few countries—perhaps with the exception of France—can yet document much, if any, success in coaxing fertility upward.[18]

AGE STRUCTURE AND DEVELOPMENT: THE STATUS OF THE STATE, IN FOUR STAGES

The scientific study of the economic implications of age structure has taken time to mature. The notion that fertility decline in low-income countries could stimulate economic growth was first posed in 1958 by demographer Ansley Coale and economist Edgar M. Hoover. Unlike prior analyses, and much that would follow (including most of the 1986 NRC report), their thesis—which would come to be known as the Coale-Hoover hypothesis—had little to say about population numbers or growth. Instead, for Coale and Hoover, the principal demographic engines of economic change were family size and age structure. Developing economies would be better off, they claimed, with a larger proportion in their adult working years and relatively fewer children.

Since Coale and Hoover's initial research, a considerable amount of theoretical modeling, observation, hypothesizing, and testing have extended the investigation of age structure from the youngest stage of the age-structural transition (a median age less than or equal to twenty-five years) to a stage that is more mature (median age greater than forty-five years) than the population of today's most mature countries (Japan, Italy, and Germany). This research has also extended investigations into a much broader realm of developmental effects, including (but not limited to) intrastate armed conflict and instability, regime type, aggregate savings, human capital accumulation, migration effects, and the solvency of pensions and

old-age health care systems. These will be discussed in the following subsections as four distinct age-structural types: youthful, intermediate, mature, and postmature. While there are dramatic demographic differences between the average age structure in each type, the boundaries between types are artificially discrete. These boundaries are necessary for classification. However, the age-structural transition is continuous and the rates that influence it—fertility, age-specific mortality, and migration—produce a virtually endless array of possible structures.

The following discussion does not feature the commonly used term "youth bulge." This has been omitted because demographers and economists embrace one definition of the term and political scientists assume another. Economists typically follow demographers in defining a youth bulge by its appearance in a population profile (population pyramid). For them, a youth bulge is truly a bulge; it appears when young adults, typically in the early part of the working age (fifteen to thirty-four) in the total population, are more populous than either children (below them) or older adults (above them). In political scientists' definition, children are not counted. A youth bulge is defined as the proportion of young adults (fifteen to twenty-four years of age) in the adult population (fifteen and older), or the fifteen- to twenty-nine-year-olds as a proportion of the working-age population. In terms of the discrete age structures presented in the following subsections, the youth bulge of the political scientists occurs in the youthful type and is typically associated with political instability. The youth bulge of demographers and economists emerges in the intermediate type and is characteristically associated with economic and social opportunities for accelerating development.

Youthful Age Structures

Youthful age structures (median age less than or equal to twenty-five years) have been much more the focus of political scientists than of economists, and for good reasons. Burdened by large and rapidly growing infant and school-age cohorts, and by the demands for childhood and maternal health care, these states often fail to provide adequate services. In high-fertility extended-family systems, their high rates of workforce growth and unemployment promote systems of patronage that further exacerbate inequalities in the distribution of services and investments among ethnicities and regions.[19] For a significant proportion of states in the youthful category—including Afghanistan, Somalia, the Democratic Republic of the Congo, and Rwanda—political violence has proved to be the most daunting of all development constraints; its costs in human capital, infrastructure, and lost investment are economically debilitating.

Age structure appears to play a role in the complex relationship between regime type and development. Youthful countries that have attained high levels of liberal democracy—"free" in Freedom House's annual assessment[20]—appear more vulnerable to political violence than are more mature democracies.[21] Because most states require political stability to sustain economic and social progress, countries with youthful age structures tend to find political stability under a partial democracy (Freedom House's "partly free" assessment) or autocracy (their "not free" category). The swift economic rise of South Korea, Taiwan, Thailand, and Indonesia

between 1970 and 1990 is consistent with this hypothesis. Only after these countries entered their intermediate stage did their regimes strengthen civil liberties and political rights until each was assessed as a liberal democracy.

Intermediate Age Structures

A substantial decline in fertility sends youthful age structures into the intermediate type (median age, greater than twenty-five to thirty-five years) and—at least theoretically—should produce four effects. The first, and probably the most difficult-to-refute effect of the four, is the production effect. With more people in the working ages and fewer childhood and elderly dependents, one can generally expect more production per capita than in youthful populations. The second effect is arguably the most important, however—age structure's ability to boost savings rates. Parents with small families save more than those with large families. With a large proportion of workers, taxes collected on production and wages can exceed public spending—so governments save too. The third is a human capital effect. Small families allow parents to invest more in each child, both financially and in care. Likewise, with fewer cohorts entering school, governments can invest more educational resources in each student, and in their health. Ultimately, a fourth effect should emerge from slowing workforce growth. While relatively cheap labor costs provide an advantage for export-oriented industrial development, wages are likely to rise for small, better-educated cohorts entering the workforce.

While the parental responses to small families were never in doubt, economists stressed that the governmental contribution to this "demographic bonus," as it came to be called, was conditional and limited to a "window of opportunity."[22] Economic and social progress at the state level, they argued, depended on the timely response of institutions to this collection of demographically generated opportunities. Country comparisons suggested that it mattered whether savings were wisely invested and those investments protected; whether the government boosted investments in children; whether it provided an inviting environment for investment, technology transfer, and scientific and technological development; or whether the government squandered these opportunities.[23]

Nonetheless, there is a great deal of empirical support for this "demographic bonus." As fertility declined across East Asia and the Caribbean, and then edged more slowly downward in Latin America and North Africa, states that experienced dramatic changes in age structure as a group experienced higher savings rates and rapid human capital accumulation.[24] However, while recent research acknowledges the role of age structure and small family size to gains in school enrollments and per-pupil spending, not all of the recently demographically maturing states reacted in a timely fashion to boost per capita educational investments or to increase the quality of schooling broadly across society—particularly in Latin America and India.[25]

Nevertheless, several economists credit a significant portion of economic growth achieved among the newly industrialized economies of East Asia—in one study, as much as one-third during the 1970s to early 1990s—to the effects of age structure.[26] Similar upturns in savings rates, human capital accumulation, and

economic growth have been noted in other states as geographically distant and culturally distinct as Ireland, Tunisia, Vietnam, and Chile, which have passed through their intermediate age-structural period.[27] For most countries in their intermediate period, their export advantage from relatively cheap labor is likely to decline as they move toward the next period (the mature age-structural type) and as wages increase while their increasing political stability typically turns them into a more favorable site for investment.

Mature Age Structures

As the workforce's largest cohort ages into its late-thirties, a country's population shifts into the mature age-structural type (median age greater than thirty-five to forty-five years). In this demographic condition—that of almost all developed countries in 2010—the advantages bestowed by a demographic bonus are expected to dissipate markedly. However, because the largest cohorts are still in the prime working years (between age fifteen and forty-four years), providing needed services to dependent children and seniors should still remain a reasonable task even as the proportion of retirees increases to significant proportion (among European countries, the proportion ranged from 12 percent to 20 percent in 2010). Recent economic modeling suggests that, where governments sustain heavy investments in human capital, higher than average savings rates—though not as high as the bonus years—could be prolonged into more mature, less economically favorable age-structural stages as some middle-aged skilled workers and professionals save more intensely for an approaching retirement that they believe is unlikely to be supported by their children or to be sufficiently provided for by a state-supported system.[28] Despite the overall favorability of the mature period, slowed workforce growth, rising wages, and the rising number of retirees with demands for an increasingly secure social safety net can be expected to reduce industrial and service sector competitiveness, pushing some production and services overseas while pressuring both private and public sectors to be more efficient.

Postmature Age Structures

Many European and several Asian countries will likely pass beyond their mature stage into postmaturity (median age greater than forty-five years) over the next fifty years. The populations of Japan, Germany, and Italy will progress into the early portion of this range between 2015 and 2020. So far there is little opposition to the hypothesis that such an age structure will slow down or even retard state economic progress and increase social equality among the elderly. Postmature age structures will feature a large proportion of people over sixty-five years of age—an unprecedented "pensioner bulge" that promises to strain pay-as-you-go state-funded pension and medical programs.

Countries that are amassing a large proportion of seniors face the possibility of a decline in economic productivity and slower aggregate gross domestic product growth or stagnation. In the future, governments of postmature countries could be pressured to vastly restrain discretionary state spending and impose a higher tax

burden. Some analysts expect aging societies to be risk averse and fiscally limited, and they contend that some European and East Asian states are likely to conclude that they cannot afford to maintain a sizable military or extend its power overseas.[29] For some low-fertility Western European countries that have poorly integrated Asian and African immigrants, the rapid growth of these minorities could erode social cohesion and promote reactionary politics.[30] Despite their logic, most of these impacts remain speculative. The magnitude of aging's effects and the ability of states with well-developed institutions to minimize aging's negative impacts are still unknown and may mitigate some of these expected problems.

In the United States and Russia, the advance of the median age and the accumulation of the proportion of seniors will proceed more slowly. For the United States the factors slowing age-structural change are a high rate of immigration (around 1 percent per year) and a fertility level that is near replacement. Russia's slow pace of aging is, somewhat ironically, the outcome of tobacco use, alcohol abuse, and related accidents. At age sixty, Russian men can expect to live, on average, another fourteen years, limiting the burden that they impose on state and family structures.

POPULATION, GROWTH, FOOD, AND DEVELOPMENT

Writing near the very end of the eighteenth century, Thomas Robert Malthus called attention to the possibility that exponentially growing aggregate demand for food would eventually outstrip the linearly growing food supply unless individual or social restraint or forms of natural or human-precipitated calamities intervened. However, the future of agricultural productivity did not turn out to be linear; Malthus had vastly underestimated the power, scope, and longevity of the scientific and technological revolutions that, even as he wrote and taught, were unfolding around him.

When Malthus's "An Essay on the Principle of Population" was first published, the article dramatically influenced European intellectual thought and public discussion.[31] That influence has since become global. However, Malthus' focus on the limits of population and population-driven aggregate demand distracts from a more nuanced appreciation of how states, through their institutions and international institutions, adapt to population density and growth (and, now, population decline in some European states and in Japan).

The following two subsections reflect an institutionalist perspective on two salient population growth and development issues. The institutional perspective has emerged from observations that the impacts of population growth have been minimized in states where there are well-developed, well-staffed, and well-funded state-sanctioned institutions—including water and resource management systems, schooling and health systems, housing and job markets, energy production and delivery systems, and credit and banking systems. In some industrial countries, these institutions have succeeded in turning much of the potential economic and social burden of population growth into benefits. Where institutions are weak, positive outcomes are less likely.

The perspective also embraces a portion of the economic literature that suggests that institutions are biased—that they favor the interests of the parties who create and fund them.[32] The observable outcomes of institutional bias are negative externalities. In other words, the positive contributions of population—such as affordable labor, needed skills, and additional consumers—generally go to the state and society's mainstream while the costs of mediating population growth and density are often shunted to local communities and interests that are underrepresented within the institution, unprotected by the state, and therefore bereft of recourse: for example, the politically marginalized, those beyond state boundaries, and future generations (and, some might argue, other species). In sum, this perspective expects the growth of population to be proportional to the flow of externalities from adaptive institutions. In its current form, the hypothesis seems difficult to test, but the process it attempts to capture is observable in the following two examples.

Grain Price Vulnerability

The dip in global grain supplies during 2007 and 2008 paved the way for heavy speculation in the international grain market, driving an unprecedented spike in food prices. While the various grains have declined from peak prices, agricultural economists remain worried. The global aggregate demand for grain in the coming decade (2010 to 2020) promises to be augmented by an additional ~700 million people in Asia, Africa, and Latin America; increasing dietary preferences for protein; and a high likelihood of a rise in the demand for grain-based biofuel. On the supply side, global warming trends are likely to depress agricultural productivity in some regions.

What is wrong with importing grain? Nothing, unless you are a low-income country with meager foreign currency reserves that are better spent on importing job-creating machinery and technology. Even some countries with substantial foreign currency reserves perceive their exposure to a volatile grain market as a national security risk. State-financed companies and sovereign wealth funds from Saudi Arabia, United Arab Emirates, India, South Korea, and China—countries that are either already experiencing low per capita cropland levels or are due for substantial population increases over the coming decades—have recently acquired rights to farmland in Africa.[33]

In 2010, twenty-one countries, accounting for about 600 million people, are assessed as either cropland or freshwater scarce, according to internationally accepted benchmarks.[34] Current technology and input costs put these countries well below the realm of food self-sufficiency. On the basis of population growth alone, another fifteen countries will join their ranks by 2025, discounting speculative changes in freshwater and cropland availability. By that year, 1.4 billion people are projected to live in the thirty-six countries that will experience either cropland or freshwater scarcity.[35]

From an institutional perspective—acknowledging the mediating power of institutions within states and of international institutions (UN organizations, World Bank, bilateral development donors, foundations)—the future growth of human

population is an unlikely cause of either mass starvation or warfare. Rather, the most plausible scenarios feature major reforms in developing countries to ameliorate their food security by further developing regional grain markets, by improving their own agricultural output efficiency, and by increasing foreign reserves by developing export industries. The most plausible scenarios, however, feature the world's major grain producers bearing the bulk of the costs by intervening in international grain markets to guarantee an equitable global pattern of distribution of affordable grain.

Renewable Natural Resources and Associated Livelihoods

History has made it glaringly apparent that the geographical expansion of human populations, the advance of urbanization, and the growth of consumer demand—all of which are influenced in no small part by population growth—have extraordinarily positive effects on the economies of states, and ultimately on state power. There is another perspective, however. Ecological histories and studies of landscape and land-use change have made it just as apparent that these effects have had dramatic and largely deleterious effects upon the productivity of renewable natural resources, the functioning of ecosystems that support these resources, and, in most cases, those human communities whose livelihoods have depended on those resources' productivity. Many, if not most, of these hard-hit communities have included indigenous populations.

The world over, the pattern of production-system change is largely the same. And, although complex, the process features increasingly higher human densities and more intimate involvement in the global economy. Hunter-gatherers yield to swidden (i.e., slash and burn) agriculturists and pastoralists, who ultimately yield to farmers.[36] Where population growth leads to urban expansion into farming areas, the latter often loses out to urban housing and infrastructure.

How does the state fare in this tradeoff? The answer is it almost always does very well. Institutions that are controlled or promoted by the state are typically biased toward actors and their actions that increase economic activity and tax revenues, augment state power, and help maintain political stability. State institutions can therefore reinforce themselves—in the name of development—at the expense of local agricultural populations.

What was the net contribution to development in these cases? The answer to that question depends on who is responding. For example, the thousands of Indian subsistence farmers and herders displaced by the Sardar Sarovar Dam's reservoir on the Narmada River are much less likely to see the dam as a contributor to Indian development than will the farmers who receive the dam's irrigation water, or the urban dweller who receives its turbines' electric power and food from the cropland it irrigates.

DEMOGRAPHY-AWARE PUBLIC POLICIES

In considering public policy options that have as their objective a response to demographic conditions or a modification of demographic trends, it is appropriate

to divide states into groups according to their age-structural characteristics. In this section the discussion returns to the three categories of countries discussed previously: youthful, intermediate and mature, and postmature. For each of these age-structural categories the policy objectives and options are very different.

Youthful Countries

Those countries in the early phases of their age-structural transition are the most politically volatile and conflict-prone as a group, and they currently pose the greatest challenges to the international system. However, as recent history has shown, their populations need not remain youthful. Of the 139 countries that began the 1970s with youthful populations—i.e., with a large youth bulge—59 have advanced beyond this category. Much of this change parallels gains in women's educational attainment. A significant portion of it was facilitated by international programs that helped governments make modern contraception and reproductive health care accessible where it was previously unavailable. That said, the task may be more demanding than it once was.

The most difficult cases remain—countries where women's social and legal status is low, where infrastructure is poor, where institutions are weak, and where political stability is lacking. Most of these remaining states are in the western, central, and eastern regions of sub-Saharan Africa, with others scattered in western, south, and central Asia. A broad range of government policies and types of donor assistance can be brought to bear to advance the age-structural transition in these remaining youthful countries. In the medium and long term, international development donors should scale up efforts to help governments improve girls' school enrollment and lengthen their educational attainment. Governments can improve women's access to family planning and maternal and infant health care, and can promote income-generating opportunities for women. Where external actors have the leverage, they should encourage a shift of family cases out of religious courts—which limit women's rights—and into secular judicial systems.

There are economic policies that may help encourage transition as well. International donors could reduce the financial risk to domestic and foreign investors who might introduce and expand labor-intensive industries and technologies capable of improving urban job markets for educated young adults, diversifying rural job markets, and stimulating a demand for schooling and job training.[37] It may also pay to improve opportunities for labor emigration from places where the growth of the young working-age population has far outstripped the national job market.

Intermediate and Mature Countries

The policy focus of countries that have reached an intermediate age structure should focus on capitalizing and sustaining their demographic bonus while preparing for the transition to even greater maturity. The wisest move that governments can make in this stage of age-structural maturity is to invest its revenue in education broadly, extending attainment among poorer regional groups and minorities. In this stage of maturity, governments should work to extend social safety nets and pension plans, as well as the taxation systems to support them, moving beyond

government employees to private industry and rural communities. States in the intermediate and mature categories should be working to bring more women into the workplace as workforce growth slows. Governments can do this by promoting workplace conditions that allow women to achieve and compete even as they meet their childbearing intentions. They can focus on enhancing immigrant and minority women's opportunities to improve their educational status, access services, and integrate and succeed in the job market.

Postmature Countries

Where fertility has reached very low levels—as it has in parts of Europe and East Asia—the coming decades will bear witness to concerted efforts by policymakers in those states to reverse or slow the trend of demographic aging, to ultimately halt population declines to boost fertility, and, in some cases, to minimize the impact of immigration and ethnic shifts. While there are as yet no simple policies that boost fertility, it is a safe bet that governments of postmature countries will spend a great deal of money and effort attempting to make their society more child-friendly and more comfortable for women who are considering marriage and childbearing.

There can be little doubt that welfare states will be fiscally pressured to restructure their systems funding old-age pension and health care plans, and that major reforms to the schedule and process of benefits loom in the future. Some governments could also be dragged into a political confrontation between pensioners (who need health care) and young families (who need education for their children) competing over limited funding. Someday demographers may decide in hindsight that the challenges of advanced aging were a small price to pay for the economic and social benefits that accrued during the intermediate and mature periods when age structures were more favorable to development. Then again, they may conclude that population aging was a destructive factor, wholly incompatible with the modern state and the extensive welfare promises it extended to its citizens in the mid-twentieth century.

CONCLUSIONS

Joseph Chamie, the former director of the UN Population Division, once told a Washington audience, "While demography may not be destiny, it's probably the next closest thing."[38] This chapter bears out this analysis. History, culture, governance, leadership, institutions, and international actors can mediate and modify demography's effects. They can influence, in some cases, the course of demographic change. Nonetheless, as recent research indicates, demography's role in development is extensive and profound, and its course over the medium term—at least over the next two decades—is largely predictable.

Many policymakers remain surprisingly underinformed about demographic trends, especially age structures, in their own countries. Many are unaware that these demographic conditions influence their government's efforts to employ young people, or that age structure affects savings, the cost of public programs, crime levels, and political stability. It is little wonder, then, that few policymakers

understand how a shift in age distribution could influence a range of economic, development, and social indicators.

Hopefully, that will change. In Europe and Japan, where the challenges of population aging are palpable, it already has. As the evidence of demography's role in development grows stronger and its theories become more coherent, policymakers are likely to consider demographic conditions as a development priority rather than an incidental outcome.

Notes

1. See Jack Goldstone, "The New Population Bomb: The Four Megatrends That Will Shape the Global Future," *Foreign Affairs* 89, no. 1 (2010): 31–43; and "Go Forth and Multiply a Lot Less," *Economist*, October 31, 2009, 29–32.

2. Julian L. Simon, *The Ultimate Resource 2* (Princeton, NJ: Princeton University Press, 1996).

3. National Research Council, *Population Growth and Economic Development: Policy Questions* (Washington, DC: National Academies of Science, 1986).

4. The Coalesian paradigm is so named in recognition of Ansley Coale's research on the economic implications of age structure; see Ansley J. Coale and Edgar M. Hoover, *Population Growth and Economic Development in Low-Income Countries* (Princeton, NJ: Princeton University Press, 1958); and Ansley J. Coale, *The Growth and Structure of Human Populations* (Princeton, NJ: Princeton University Press, 1972).

5. See Edward A. Wrigley and Roger S. Schofield, *The Population History of England 1541–1871* (Cambridge: Cambridge University Press, 1987), ch. 8; and Jack A. Goldstone, "The Demographic Revolution in England: A Re-examination," *Population Studies* 49 (1986): 5–33.

6. This trend was reversed when fertility declined from about 5 children per woman to around 3.5 toward the end of the nineteenth century. By 1910, nearly all of Western Europe's populations were experiencing total fertility rates below 4.0 children per woman, with the exception of the populations of Portugal, Spain, Italy, and the Scandinavian states. And by 1980, nearly all of Europe, excepting the Balkan states, Ireland, and Iceland, had dropped below the 2-child-per-woman replacement level. For perspectives on the implications of changes in fertility and mortality in preindustrial Europe, see Jack A. Goldstone, *Revolution and Rebellion in Early Modern Europe* (Berkeley: University of California Press, 1991); Massimo Livi-Bacci, *The Population of Europe* (Oxford: Blackwell, 2000); and Edward A. Wrigley, *Poverty, Progress, and Population* (Cambridge: Cambridge University Press, 2004).

7. In this chapter, the measure of fertility cited is the total fertility rate (TFR), the number of children that a woman in the population is expected to bear, on average, during her lifetime. Unless otherwise stated, the source of estimates and projections of this measure, and all other demographic indicators, is the UN Population Division, *Population Prospects: The 2008 Revision* (New York: UN, 2009).

8. Jean-Claude Chesnais, *The Demographic Transition* (Oxford: Clarendon Press, 1992).

9. The forecast of Iran's transition relies on the medium variant fertility projection published by the UN Population Division, *World Population Prospects*, 2009.

10. Ibid.

11. For a historic discussion of this development perspective, see Nancy Birdsall, "Population Growth and Poverty in the Developing World," Working Paper 404 (Washington, DC: World Bank, 1980).

12. For a review of the history of this effort, see Phyllis T. Piotrow, *World Population Crisis: The United States Response* (New York: Praeger, 1973); Peter J. Donaldson, *Nature against Us: The United States and the World Population Crisis, 1965–1980* (Chapel Hill: University of North Carolina Press, 1990); and Oscar Harkavy, *Curbing Population Growth* (New York: Plenum Press, 1996).

13. The case of fertility leading economic development is statistically examined by Holger Strulik and Siddiqui Sikandar in "Tracing the Income–Fertility Nexus: Nonparametric Estimates for a Panel of Countries," *Economics Bulletin* 15, no. 5 (2002): 1–9.

14. Notably, this strategy was elucidated nearly two decades before in a classified national security study requested by the Nixon administration; see the now unclassified report: National Security Council, *Implications of Worldwide Population Growth for US Security and Overseas Interests* (Washington, DC: National Security Study Memorandum 200, 1974). Funding for USAID family planning assistance increased steadily thereafter until the 1996 Republican-dominated Congress dramatically reduced its budget. Because USAID's education assistance program was coeducational, girls' education received little attention until the second term of the Clinton administration.

15. John Bongaarts, "The Causes of Stalling Fertility Transitions," *Studies in Family Planning* 37, no. 1 (2006): 1–16.

16. David Brown, "Africa Gives ABC Mixed Grades," *Washington Post*, August 15, 2006; and Richard P. Cincotta and Barbara B. Crane, "The Mexico City Policy Restrictions and US Family Planning Assistance," *Science* 294, no. 5542 (2001): 525–26.

17. Wolfgang Lutz, Vegaard Skirbekk, and Maria Rita Testa, "The Low Fertility Trap Hypothesis: Forces that May Lead to Further Postponement and Fewer Births in Europe," *IR-06-017* (Laxenburg, Austria: Institute of Applied Systems Analysis, 2006).

18. Richard Jackson and Neil Howe, *The Graying of the Great Powers* (Washington, DC: Center for Strategic and International Studies, 2008).

19. Roel van der Veen, *What Went Wrong with Africa* (Amsterdam: Kit Publishers, 2004).

20. In political science literature, liberal democracy has been associated with the category "free" in Freedom House's annual assessment, or with values of +8 to +10 in Polity IV polity scores. See Freedom House, *Freedom in the World* (Washington, DC: Freedom House, 2009); and Montgomery G. Marshall and Keith Jaggers, *Polity IV Project, Political Regime Characteristics and Transitions, 1800-2007: Dataset Users' Manual* (Fairfax, VA: Center for Systemic Peace, George Mason University, 2009).

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25. Dennis A. Ahlburg and Eric R. Jensen, "Education and the East Asian Miracle," in *Population Change and Economic Development in East Asia*, ed. Andrew Mason, 231–56 (Stanford, CA: Stanford University Press, 2005); Birdsall, Bruns, and Sabot, "Education in Brazil."

26. Jeffery G. Williamson, "Demographic Change, Economic Growth, and Inequality," in *Population Matters: Demographic Change, Economic Growth, and Poverty in the Developing*

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27. David E. Bloom and David Canning, "Contraception and the Celtic Tiger," *The Economic and Social Review* 343 (2003): 229–47; Centro Latinoamericano y Caribeño de Demografía, CEPAL, "Proyección de Población: América Latina y el Caribe," *Observatorio Demográfico*, no. 3 (Santiago de Chile: United Nations, 2007), 17–23; UNFPA, "Golden Opportunity, Golden Pitfalls," March 17, 2010, accessed, February 7, 2011, www.un.org.vn/en/news-highlights-press-centre-submenu-254/1242-golden-opportunity-golden-pitfalls-.html.

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37. UN Office for West Africa, *Youth Unemployment and Regional Insecurity in West Africa* (New York: UN, 2005).

38. Quoted with permission from a presentation given July 26, 2004, at the Center for Strategic and International Studies, Washington, DC.