The Soft Underbelly of Development: Demographic Transition in Conditions of Limited Economic Change

John C. Caldwell

Population policy is driven by two sets of theories, which are examined here. The first, demographic transition theory, proclaims the inevitability of a global transition from high to low birth and death rates as a world society and economy develop. Experience to date supports this generalization, but researchers have had little success in identifying threshold socioeconomic or demographic indexes that would predict the onset of fertility decline. The second, demographic-economic theory, predicts that slower population growth rates will lead to faster rises in per capita income. The historical evidence does not confirm these predictions, however. This paper examines the case of Sub-Saharan Africa, where mortality has been falling consistently, although often driven more by educational and other social changes than by rising incomes or enhanced medical care, and halted only by war and civil disorder. However, declining fertility in Sub-Saharan Africa is not a certainty, despite population projections by international organizations that assume that widespread decline is imminent. Evidence indicates that African fertility is peculiarly sensitive to infant and child mortality levels, and therefore amenable to decline through service-intensive combined health and family planning programs; but it is not clear that governments can implement such programs on a national scale. On the demographic-economic nexus, some evidence suggests that in Sub-Saharan Africa high levels of natural population increase do slow growth in per capita income. Family planning programs might also catalyze changes in family social and economic structures that would contribute to faster economic growth. Finally, as the full scale of the African AIDS epidemic becomes clearer, it will come to dominate all other population-related concerns, creating a compelling case for huge expenditures on comprehensive health, family planning, and social services aimed at reducing mortality, curing sexually transmitted diseases, detecting HIV infection, and providing follow-up services.

The population element is described here as the "soft underbelly" of development only in the sense that until now its theoretical relationships to development have not been sustained by empirical testing. Thus, although policy interven-
Debate on population policy has always been fiercest about the propriety and likelihood of success in controlling fertility—so much so that population policy and fertility control policy have often been regarded as synonymous. However, clearly mortality matters as well, and this paper deals with both mortality and fertility changes.

Regarding mortality, the important questions this study addresses are whether continuing decline is occurring; if so, what drives it; and what impact the spread of acquired immune deficiency syndrome (AIDS) is likely to have.

Regarding fertility, the key questions are whether fertility is likely to fall at all; whether there are advantages in economic development to be gained from declines in fertility; and whether policies adopted successfully elsewhere in the world to achieve declines in fertility are relevant for Africa.

The paper examines the general questions regarding relevant demographic theory and evidence in this order: (1) Is it certain that fertility will soon be falling everywhere in the developing world? (2) Is it certain that economic gains will accrue from such decline? (3) What drives mortality decline? (4) What do local studies in Asia show about why populations begin to control their fertility? (5) Can intensive small-area family planning programs lower the birth rate even in areas where there has been only limited socioeconomic change?

A salient reason for focusing on Sub-Saharan Africa is that the demographic indicators for this region are among the most adverse in the world. Life expectancy in Sub-Saharan Africa is barely fifty years, compared with fifty-five years in South Asia, sixty years in North Africa and the Middle East, more than sixty years in Southeast Asia, and more than sixty-five years in East Asia and Latin America (and seventy-five years in industrial countries). Fertility in Sub-Saharan Africa averages more than 6.5 children per woman, compared with 4.8 in South Asia, 5.5 in North Africa and the Middle East, 3.9 in Southeast Asia, 2.3 in East Asia, and 3.7 in Latin America (and 1.7 in industrial countries). More significantly, Sub-Saharan Africa is the only major region in the world that so far has shown no certain signs of a decline in fertility.

Demographic expectations and plans for Africa usually cannot be understood solely in terms of African evidence. In Asia—especially in Southeast and South Asia—the first fertility declines often were achieved in the late 1960s with government assistance and at income and mortality levels similar to those of a range of African countries at that time. Comparative data on Latin American fertility
are not very useful for Africa, however, because the fertility transition in Latin America from the mid-1960s onward was largely a spontaneous social movement in circumstances similar to those obtaining decades earlier in Europe. Usually, then, expectations for Africa are largely derived from assumptions based on Asian precedents or on theories largely formulated from the Asian experience. This paper thus attempts to identify and build on the theories and Asian experiences that are most likely to influence policy planning in Africa.

Besides the five questions above, the paper poses the following questions on Sub-Saharan Africa: (6) Is mortality decline—significant both as a developmental gain in its own right and as a basis for the control of fertility—faltering, and has the potential impact of AIDS been addressed adequately by policymakers? (7) Are African societies more pronatalist than other societies, and are there material reasons why this should be so? (8) How is African fertility determined? (9) Why has Africa failed to implement fertility control programs that exhibit the Asian pattern of success? (10) Given the foregoing problems, are current population projections providing us with a realistic guide? (11) Given also that there are thirty-five independent countries with populations exceeding 1 million in Sub-Saharan Africa—thus allowing national comparisons on a scale impossible anywhere else—does the evidence support the case that material economic advantages accrue from slower rates of population growth? (12) What does the future hold for Sub-Saharan Africa, and what should be done to make it the best future possible?

I. General Questions

Population interventions have been based on two interrelated groups of theories. The first centers on the notion of demographic transition. This theory describes and seeks to explain a process whereby, as economic development occurs and as a global economy (and perhaps a global society) comes into being, both mortality and fertility ultimately and inevitably will decline to low levels.

Demographic theories have interested development planners who have come to suspect that as the trends in global economic development and population proceed, demographic change—especially declines in fertility—may not be a purely dependent variable and that such change, particularly fertility declines, may be self-sustaining and may accelerate economic development. The second group of theories, demographic-economic theories, purport to show how such interrelations work.

Is It Certain that Fertility Will Soon Be Falling Everywhere in the Developing World?

The concept of demographic transition—the parallel fall in both fertility and mortality rates—gained currency in the early twentieth century, as theorists
began to generalize about observations of declining mortality and fertility in France and in other Western countries.\(^1\)

Undoubtedly the greatest impact during the last forty-five years on the attitude of development planners toward population derived from the work done during World War II by a group headed by Frank Notestein at Princeton University's Office of Population Research. Notestein and his team carried out a series of studies of national population trends, first for the League of Nations and then for the U.S. Department of State (see Notestein 1943; Notestein and others 1944; Davis 1951; Kirk 1944, 1946; Taeuber 1958; and Lorimer 1946). They concluded that all societies would eventually reach low levels of fertility and mortality. At the 1943 Hot Springs Conference, which created the basis for the U. N. Food and Agriculture Organization (FAO), Notestein proposed some of the early ideas on demographic-economic theory, particularly that economic and social development not only would bring down fertility and population growth but would eventually "help stimulate parents to new aspirations for themselves and their children—aspirations that are incompatible with large families" (Schultz 1945, p. 210). Blacker (1947) placed even stronger emphasis on demographic transition as beginning and ending with zero population growth, a notion that has reappeared in recent years, once again with little more justification than the appeal of symmetry.

An attempt to formulate demographic transition theory's postulated relationship between development and the onset of fertility decline in terms of economic and social indexes was made by the United Nations (1965) in terms of what has become known as threshold theory. To determine thresholds, the United Nations study examined twelve measures ranging from per capita income to urbanization, mortality levels, female literacy, and even cinema attendance. Such an approach has a theoretical attraction, but empirical testing has shown it to be of little value. In fact—although the authors were reluctant to admit it—the real value of the U.N. exercise was to discount completely the possibility of generalizable thresholds across societies. The research showed that the decline in fertility had begun in some societies at one-third the per capita income level that had been needed in others and that the finding held with regard to energy consumption at one-ninth the level, urbanization at one-seventh, and infant mortality at one-fourth. Even the more culturally homogeneous population of Europe, studied by the Princeton Office of Population Research project of the 1970s, did not yield a set of meaningful thresholds (Coale and Watkins 1986).

Studies of historical data at Princeton and elsewhere have permitted comparison of the onset of fertility transition in Europe, which took place generally in

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1. French concern about low birth rates was mentioned frequently in both the French- and English-language press of the period. Willcox (1916) formulated a demographic transition theory from American experience, and Knibbs (1917) published data showing the course of a global transition. Knibbs (1917) and Pearl (1939) produced mathematical formulations of the path of population growth during the transition. Thompson (1929) began to characterize the necessary stages of transition.
the late nineteenth century, with the onset of fertility transition in Asia, in the middle to late twentieth century, and to demonstrate how different the two are in terms of threshold indexes of fertility decline.

Knodel and van de Walle (1979) compared European economies, with fertility declines beginning in the period 1882–1900 (as measured by a decline of 10 percent in fertility), with Taiwan and Thailand, with onsets in 1963 and 1970, respectively. Two differences in the European and Asian samples are striking: the European economies began their transitions with much smaller initial family sizes and with much higher infant mortality rates. Overall fertility in Europe was two-thirds the Asian level, as measured by an index of fertility ($F_0$ based on the birth rate of the Hutterite religious sect) of 0.32, compared with the Taiwanese and Thai samples of 0.42 and 0.51, respectively. European infant mortality ranged between 150 and 200, as measured by deaths during the first year per 1,000 live births, whereas the rates for Taiwan and Thailand were 49 and 77, respectively. Europeans of the late nineteenth century thus were far less worried that subsequent mortality would erode family size or even result in childlessness.

The other indexes are not particularly instructive as indicators of fertility decline. At the onset of transition, 20 to 40 percent of Europeans lived in towns with more than 20,000 inhabitants. Taiwan, too, fell within this range, although Thailand had a lower level of urbanization. Nevertheless, the similarity may mean only that we are considering a rather homogeneous range of European economies. European illiteracy levels were generally below 20 percent, and Thailand, too, fell within this range at the time of transition, although Taiwan was at 30 percent. Yet this may indicate little more than the importance of biblical literacy in some Northern European economies or the greater difficulty in achieving literacy in the ideographic Chinese writing.

F. van de Walle (1986) showed that there was some doubt about whether low child mortality was a threshold for fertility decline, or low fertility a threshold for mortality decline, and concluded that both occurred in Europe with modernization. Coale (1973, p. 65) concluded that the European project had shown that (1) fertility must be within the calculus of conscious choice; (2) reduced fertility must be seen to be advantageous; and (3) effective techniques of fertility reduction must be available.

The 1950s saw a transitory interest in the macroscopic aspects of demographic-economic interrelations. Leibenstein (1957) and Nelson (1956) argued that high levels of population growth could prevent both economic takeoff and the onset of demographic transition. But rapid economic growth in parts of East and Southeast Asia—despite high rates of population growth—undercut the notion of a demographic trap (that is, a situation in which any economic growth would lower mortality levels, thus speeding up population growth).

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2. $F_0$ is a fertility-weighted index that assumes maximum possible fertility as that of a religious sect in the United States in the 1930s, the Hutterites, who did not control their fertility and for whom the index is set at 1.00. The index was developed by Coale (1967).
growth to a point where the original per capita income and mortality gains were nullified—essentially Malthus's position).

The last fifteen years have seen a strong revival in interest in the economic determination of fertility decline. The revival focused on the economics of the family as a way of explaining why many societies were failing to seize the opportunity provided by the new family planning programs to control family size. The central argument was that in these societies each child represented a net economic gain to the parents because of such contributions as child labor or support to parents in their old age, especially in circumstances in which child rearing was not very expensive. The focus was often on both the conditions of stable high fertility and the circumstances when instability—that is, fertility declines—first occurred.

Easterlin (1975; Easterlin, Pollak, and Wachter 1980) placed the transition in a “market” context, whereby before transition the demand for children was higher than their supply and where the cost of reducing that demand included the cost of practicing contraception—both economically, in terms of money and time, and psychically, in terms of the disapproval of relatives and the community. Becker (1960), Schultz (1969), and others of the New Household Economics School saw transition as occurring when the cost of children became greater, and they included not only expenditure on the children but the costs to mothers, both in income forgone and also in the value of their time, even in terms of non-income-generating time.

Caldwell (1976, 1978, 1982), in the wealth flows theory, argued that fertility decline began when there was a reversal of the net flow of resources—toward children rather than parents—but that this economic change was the result of social changes that concentrated greater family concern on the children.

Ben-Porath (1980) provided an economic analysis of stable high fertility, arguing that in this situation family transactions were often preferable to external transactions in markets, and implying that fertility transition began as the market competed ever more effectively with family-produced goods and services.

Cain (1981) emphasized the value of children as risk insurance for their parents and argued that fertility decline was much less likely in rural Bangladesh than in rural India because the greater development of capital markets and public relief employment in India substituted for some of the assistance that could be provided only by children in Bangladesh. Nugent (1985) asserted that the whole question of old age security and its relation to fertility was far more complex than current theorizing or field research suggested.

Most of these theories emphasize that fertility decline arising from social change affects the family's economic calculus, as does market penetration. There are vaguer suggestions that market penetration may accelerate social change and that family change may allow swifter market penetration.

The chief assault on theories citing economic and socioeconomic determinants has come from those maintaining the importance of the diffusion of ideas about controlling fertility or even of knowledge of and access to contraception.
At first, the “innovationist” interpretation was discounted by social scientists. For example, Stix and Notestein (1934, 1940) concluded from an early study of a family planning clinic in New York City that everyone already knew the so-called natural means of fertility control and hence that the onset of fertility transition was the result not of the diffusion or legitimation of birth control ideas or the greater availability of contraception but of broader socioeconomic phenomena.

Later, anthropological demographers countered the innovationist argument by advancing the view of an “ancient” practice of family size limitation—that is, maintaining that even pretransitional societies had practiced deliberate fertility control. This perspective was accidentally reinforced by the Princeton European indexes of marital fertility (see Coale 1967), which showed that birth rates in nearly all societies were below the theoretical maximum. For example, Leibenstein (1975, p. 2) concluded that rates well below the Hutterite level show that even in circumstances where fertility is traditionally high, there is a “considerable degree of control.”

In fact, however, most pretransitional populations have fertility levels well below those of the Hutterites—even when they are not making decisions to control family size. Such “natural fertility” regimes were the general case, even in England as late as the first half of the nineteenth century, as Wilson (1984) demonstrated. Thus, the Hutterites are not a good comparator population because they were a twentieth-century American population, well fed, with high levels of protein intake and declining durations of breastfeeding—all conditions conducive to high birth rates that did not necessarily obtain for other populations.

The innovationist viewpoint has gained renewed currency as critics of the socioeconomic determinist viewpoint have poked holes in that theory’s conceptions of fertility control. According to Caldwell, Caldwell, and Caldwell (1987), the notion of “ancient” fertility control was based on successive misinterpretations of the evidence. Moreover, data from ongoing family planning programs and historical research have increasingly validated the innovationist perspective. Coale (1973, p. 62) agreed that the evidence from the European project that illegitimate fertility had fallen at about the same rate as legitimate fertility in Europe between 1850 and 1930 gave strong support to the innovationists.

Mauldin and Berelson (1978) concluded that about 55 percent of the 1965–75 fertility decline in developing countries could be explained by the new availability of contraceptives, but they attributed two-thirds of this effect to latent demand rather than to the idea that providing contraception itself changed viewpoints and behavior. A new review focusing on the 1986–87 period comes to a similar conclusion (Westoff, Moreno, and Goldman 1989).

Further buttressing the innovationist case, studies of several Asian populations have shown that respondents attributed their own ability to control fertility to the availability of family planning facilities and that they attributed the inability of their parents to do so to the lack of such facilities (Caldwell, Reddy, and Caldwell 1985, 1988; Basu 1984; Tuladhar 1987; Jain 1989). However,
Caldwell, Gaminiratne, and others (1987) showed that in Sri Lanka, because the demand for fertility control emerged long before the government provided family planning facilities, people gradually had resorted to withdrawal, rhythm, and abortion to limit births, as also happened in the West in an earlier period.

In a self-styled iconoclastic but nevertheless persuasive view, Cleland and Wilson (1987) surveyed both the historical and contemporary evidence, especially the World Fertility Survey (WFS) data, and concluded "that attitudes toward birth control, broadly defined, are of central explanatory importance for the timing of fertility transition" (p. 29). They identified the need for the prior existence of a latent desire for fertility reduction, and clearly regarded the availability of contraception as actualizing and legitimizing that demand. They agreed with Caldwell and Ruzicka's (1978) conclusion, from their analysis of the Australian experience, that whole societies moved at a rather similar pace to reduce their fertility. This view is in conflict with the *embourgeoisement* theory, enunciated by Lesthaeghe and Surkyn (1988), which places emphasis once again on the essential leadership of upper-class innovators.

The conflict among social theorists about the onset of fertility decline is now more in emphasis than in substance. Most agree that social change can be accelerated by providing contraception and legitimizing its use, so long as the economic calculus is not completely against fertility decline; that is, so long as there is some latent demand. The major controversy is beginning to focus on whether there is already any significant latent demand in Sub-Saharan Africa.

Researchers have gained experience over the last two decades with fertility transitions that go far beyond the availability and legitimation of contraception. Although social scientists have tended to regard these cases as abnormal and have conspicuously failed to bring them within demographic transition theory, these measures warrant serious consideration. At their mildest, such additional measures include incentives. Satia and Maru (1986) concluded that in India incentives and disincentives had some impact. The evidence from China's experience over the last dozen years is that Asian societies with traditions such as China's, and governments of its type, can reduce fertility to levels well below anything suggested by latent demand. India achieved no less remarkable declines of fertility during the Emergency of 1975–77, and only the return of democratic government prevented India's fertility from following a similar course to that of China.

A less extreme case is provided by Indonesia. There, strong government leadership has been reflected in considerable local pressure in securing fertility decline. It is doubtful whether such programs would work, or whether governments would survive their imposition, either in the Moslem and Christian heartlands or in the very different circumstances of Sub-Saharan Africa.

Perhaps the most general conclusion that can be made is that there is no specific developmental threshold at which fertility begins to fall spontaneously: France was probably an example of unusually low thresholds; Africa may prove to have some high thresholds. Government intervention, if strong enough, can
produce fertility decline at any level of socioeconomic development. The real question is whether such governments are likely to survive and whether their subjects or planners would feel that the achievement was worthwhile.

Is It Certain that Slower Population Growth Brings Economic Gains?

Theories of Demographic-Economic Interrelations

The oldest thesis on demographic-economic interrelations is that of carrying capacity, especially in terms of the food supply. Demeny (1988) has pointed out that this view is at least as old as Ecclesiastes (5:11): “When goods increase, they are increased that eat them.” The most famous modern variant of the theory is that of Malthus, which depended not only on ceilings to carrying capacity but also on a concept of diminishing returns. Both concepts exist in the contemporary ecological literature. One would imagine that a test case would be provided by Sub-Saharan Africa, given its trend toward importing an ever greater proportion of the food consumed and the occurrence of successive famines. Somewhat surprisingly, the 1982 FAO-International Institute for Applied Systems Analysis study (Higgins and others 1982, p. 34) claimed that the carrying capacity of the continent was 1.6 times the population projected for the year 2000 with no improvement in agriculture; 5.8 times that population with improved tools and modest inputs of fertilizer and pesticides; and 16.5 times with the full development of industrialized scientific agriculture. These ratios can be compared with the eventual multiplication of the continental population projected for 2000 of only 3.5, anticipated by the most recent World Bank population projections to be fully attained only after more than another hundred years (Bulatao and others 1989). These views are in direct conflict with the analysis of Allan (1965), who reported twenty-five years ago that shifting cultivation was already encroaching dangerously on the fallow with resultant declining soil fertility. In contrast, Mortimore (1968) demonstrated that manure and other inputs had permitted the establishment of relatively dense sedentary agricultural populations in the grassland soils around Kano in the West African savanna.

Probably the demographic-economic analysis with the most influence on modern development activities was that of Coale and Hoover (1958). They argued that high rates of population growth led to slow increases in per capita income because of the disadvantages of high population densities; of the impact on capital accumulation; and of the maintenance of a less than optimal age distribution. The heart of this argument was that the higher the rate of population growth the higher the proportion of saving that had to be spent on creating new social infrastructure such as schools for the growing population, or on duplicating productive capital rather than increasing the ratio of productive capital to the existing work force. In their analysis of projected changes in India over the period 1956–86, Coale and Hoover calculated that per capita income would rise only 38 percent with high fertility but could rise by 95 percent with significant declines in the level of fertility. This argument was put most forcefully by Enke (1968), who wrote, “The value of a birth prevented in a develop-
ing country is one to two times the annual per capita income of that country. . . . One percent of the total development budget spent on reducing births is as effective in raising output per person as the other 99 percent of the budget.” These arguments have come under heavy attack. Leibenstein (1969) said that the results depended largely on the assumptions and changed with them. The age distribution disadvantages depend on the ages at which people work, although it is possible to argue that although fertility decline is not economically advantageous in a society where children work from young ages, it would be advisable if the society was succeeding in putting most children in school for substantial periods. Empirical confirmation proved impossible to find. Kuznets (1956) examined eleven now-developed countries over the half-century up to 1914 and could find no correlation between the rates of growth of population and per capita income. He later (1967) failed to show any such relationship after examining the history of either developed or developing countries. The same conclusions were reached by Easterlin (1967), who examined the experience of all developing countries with more than 2 million people in the six years following 1957–58, and by Chesnais and Sauvy (1973) in an examination of sixteen countries in Western Europe and seventy-six developing countries during the decade 1960–70. Kuznets (1967, p. 189, n. 15) was not surprised at the absence of a clear demographic-economic relationship because he argued that the per capita gains shown by Coale and Hoover during the first twenty years of fertility decline could be more than offset by a minor change in capital-output ratios. The second version of the United Nations’ *Determinants and Consequences of Population Trends* (1973), which, in fact, contained little on consequences, admitted the lack of correlation in the historical experience to date but anticipated future correlations. Simon (1981, pp. 81–82) has argued that much of the gain identified by Coale and Hoover was transient, arising from changing age structure as fertility falls, but not existing over a longer period. One possible response might be that many countries would value such a transient period as giving them a chance to get all children into school.

The Coale and Hoover arguments were put with renewed force in the World Bank’s *World Development Report 1984* (World Bank 1984; hereafter WDR), prepared immediately before the 1984 International Population Conference in Mexico City. The arguments placed great emphasis on the problems of schooling everyone where population growth rates were high, and on widening productive capital. It concluded (p. 105) that “Population and development are interrelated in many ways, not all of them fully understood. . . . The complexity of the subject makes it tempting to be agnostic about the consequences of rapid population growth. Nevertheless, the evidence discussed above points overwhelmingly to the conclusion that population growth at the rapid rates common in most of the developing world slows development.” The WDR (p. 121) did concede that in Kenya (and presumably by implication in the rest of Sub-Saharan Africa) the diverting of the majority of expenditure to lowering child mortality would probably be more cost-effective in reducing fertility than spending the majority of it directly on family planning.
Many economists found the WDR evidence less than convincing, as reported in a review symposium published in Easterlin, Clark, and Lee (1985). Leibenstein argued, “To the extent that data are reported in the Report, they are almost entirely simulations or projections. That is, these calculations are based on assumptions compounded onto population data rather than on observations of population and economic variables to seek causal connections.” Lee criticized the unwillingness to come to terms with the historical data; the dismissal without serious discussion of “the possible influence of population size, population growth rate or population density on technological progress . . . although it is the centerpiece of the work of Boserup and Simon,” and the leaving of the relation of education to population growth rates and age distributions on a priori arguments rather than on empirical relations. Leibenstein quoted Perlman (1975, p. 256): “If we use antinatalist programs, we do so for reasons other than those simply offered by what we as economists know.”

At this stage of our thinking on the demographic-economic interactions, the safest conclusion would be to adopt Perlman’s. The best arguments for such interventions are likely to prove to be ones of historical analogy and of those family changes that suit economic development.

**Mortality Change: What Drives It?**

Life expectancy at birth in Northwest Europe, North America, and Australasia rose from around forty years in the early nineteenth century to fifty years in 1900 and is now almost seventy-five years. The swiftest rise occurred between 1880 and 1950, partly propelled in the first quarter of the present century by a decline in infant and child mortality that was at its steepest after the onset of fertility decline and not before. Life expectancy in the developing countries had reached fifty years by the late 1960s, but this was an uneven mixture of a life expectancy of sixty years in Latin America ranging down to forty years in Sub-Saharan Africa. Those levels have now reached around sixty-three years, although Sub-Saharan Africa still averages around fifty years and South Asia little more than fifty-five.

The forces driving the mortality decline are once again the subject of debate. McKeown (1967) attempted to discount the progress of scientific medicine before the present century and identified the driving force as improved living conditions. He probably overestimated improvements in nineteenth-century nutrition while understating improvements in water supply and sanitation (Preston and van de Walle 1978), the impact of educational and other social changes, and possibly improvements in the medical system that were not associated with breakthroughs in medical science.

Impressive declines in mortality in much of the developing world following World War II revived interest in the causes of such change. Stolnitz (1965) identified the cause as the growth of a global society and the transfer of medical technology after the war. Kuznets (1956), conversely, showed that these trends had begun earlier, in the prewar colonies.

The present author (Caldwell 1986) has been associated with some of the
revisionist thinking that has been termed *health transition*. It is clear that in many countries improvements in the health services have been associated with subsequent unusual declines in mortality. Life expectancy increased by twelve years between 1946 and 1953 in Sri Lanka, at seven times the rate of the previous half-century. Similarly, it jumped twelve years in the Indian state of Kerala in 1956–71 and seven years in Costa Rica in 1970–80. The immediate cause of these unusual advances was in each case a health revolution, but, except for the DDT campaign against malaria in Sri Lanka, it did not take the form of the application of new knowledge. In each case, the success was achieved by democratizing the health services by widening access to free or cheap services to the rural and urban poor populations, often with the kindling of a kind of revolutionary fervor. This recipe has not succeeded everywhere. The great successes were achieved in democratic countries where the electorate had an increasing awareness of its rights; in societies that were fairly egalitarian and well educated; and where women possessed a substantial degree of autonomy. An examination of mortality levels for 1982 in developing countries showed the best predictors of low mortality were the proportions in school—especially the female proportions—a generation earlier, and the extent to which family planning is practiced. The supply of physicians was of lesser importance, although still more important than nutritional levels or income. The educational findings relate of course to the educational levels of parents. The examination of the high levels of correlation between maternal education and child survival has become a major academic industry (Caldwell 1979; Cleland and van Ginneken 1988; Cleland 1990). Caldwell (1986, p. 174) identified eleven countries that in 1982 had mortality rankings well above what would have been predicted by income levels and another eleven with rankings well below. The first group contained countries or states such as China, Kerala, and Sri Lanka, with life expectancies approaching seventy years despite per capita incomes around US$300. The latter were predominantly Middle Eastern and North African countries, many with life expectancies in the fifty- to sixty-year age range and per capita incomes of several thousand dollars.

The former had much lower incomes and no more doctors, but the women were not secluded and had higher education levels. Child survival seems to depend to a considerable degree on the mother's self-assurance and the mother's capacity to take action. What is clear is that continuing improvement in health depends on changing the structure of the health system so as to give more universal and equitable access; and on continuing social change in a democratic direction, with more social and gender equality. It might be noted that mortality is much more sensitive to educational differences in the contemporary developing world than in the comparable case at the beginning of the century in the West—probably because education in developing countries imports the social and behavioral adjustments that the West has made to medicine and science (Preston 1985; Ewbank and Preston 1990; Caldwell 1990).

Mortality change has been the product of massive social change, economic
growth, and the development of medical science. Future policies are likely to be most successful if they concentrate on the democratic provision of health services and the enhancement of the social changes that multiply its effectiveness—female education and female autonomy foremost.

What Do Asian Local Studies Show Us about the Onset of Fertility Control?

This section focuses on three studies in fertility transition: one in Thailand; one in Sri Lanka; and the other in a small area of rural India. Knodel and colleagues (Knodel, Havanon, and Pramualratana 1984; Knodel, Chamratrithirong, and Debavalya 1987) have reported on Thailand’s fertility decline, in which fertility halved in two decades from a total fertility rate (the average number of live births women would have in a lifetime if fertility remained constant at the current level) of 6.3 around 1965 to 3.4 in 1983, and to near replacement levels now. Between 1969 and 1981 contraceptive prevalence increased from 15 to 60 percent, at first with very little organized assistance from government.

The researchers, employing a focus group approach as well as surveys, came to a series of conclusions with regard to one of the world’s fastest fertility declines. First, the Thais, although not traditionally opposed to large families, had never been strongly pronatalist and had not made high fertility a central aspect of their religion or culture. Partly in consequence of this, fertility decisions in recent decades have mainly been a matter for the young couple and have not been regarded as lying within the domain of the larger family. Second, there has been rapid economic and social change. The economic change singled out as most important was not so much the rise in per capita incomes—although this has occurred, moderately at first and more rapidly lately—as the penetration of the market economy and the conversion of most transactions to a cash basis. On the social side, the major aspect of change was in a turning downward of the wealth flow, with an ever-increasing demand for child schooling and child care. Now, almost all Thai children of primary school age are in school, and one-third of those of secondary school age; and infant mortality has dropped since 1965 from almost 100 to less than 40. Third, the research identified a latent and recognized demand for smaller families well before 1965. Fourth, the research identified as an important factor the provision of family planning services, especially by the government. This had the pretransitional effect of crystallizing attitudes toward family size, as well as allowing those attitudes to be translated into smaller families. The researchers found no evidence of pretransitional substantial knowledge of natural methods nor any evidence that those methods could have effected the fertility transition.

An interesting comparison is provided by a study of Sri Lanka (Caldwell, Gaminiratne, and others 1987), probably the only Asian country other than Japan to have experienced any significant fertility control before World War II. This control appears to have taken place in the economic depression of the 1930s and is a measure of how market-oriented the economy was by that time,
and how hard it was hit by declining world prices for its plantation exports. Moore (1985) has calculated that a majority of rural Sri Lankan households depended on some nonfarming income as early as 1931. Demand for fertility control was encouraged by a range of factors. Sri Lanka's education levels were unusually high, with the 1921 census recording the same proportion of girls in school as did the 1971 Pakistan census. Buddhism, especially as it emerged from the Buddhist Reform Movement of the nineteenth century, gave no special emphasis to fertility—certainly not the emphasis it gave to enlightenment and education. Nevertheless, what fertility control did take place in the 1930s appears not to have been autonomous but to have been affected by the West's family planning debate of the 1930s. It was given direction by the translation into Sinhalese and Tamil of family planning manuals, and, in a population that was one-tenth Catholic, by the teaching of the Catholic Church on rhythm (a method of self-restraint that appealed to Buddhists). When marital fertility decline began again in the 1960s, rhythm and withdrawal predominated as the methods of fertility control, not to be overtaken until the 1980s by the sterilization and contraceptive services provided by the government program. An instructive minor theme in the Sri Lankan experience was a decline in fertility during the 1950s among the poor and poorly educated Indian Tamil tea estate workers (Langford 1982; Caldwell, Gaminiratne, and others 1987). This appears to have been achieved by partial or total sexual abstinence and some abortion and was carried out by a wage-earning proletariat in circumstances in which women's employment was central to the family economy. It also affected their right to retain housing, a matter of great insecurity following Sri Lankan independence, partly because of questions of residence status, and partly because of changing estate ownership and doubt about the future of the estates.

The final study is that of nine villages with a total population of around 5,000 in rural Karnataka State, India, studied between 1979 and 1984 (Caldwell and Caldwell 1984; Caldwell, Reddy, and Caldwell 1988). In this area, infant and child mortality had been slowly falling. Differentials by family income were small but by maternal education were large and explained much of the change that had occurred. Part of the explanation for the greater survival of the children of educated mothers was that the latter felt more personal responsibility and took more effective action to prevent sickness and accidents; but even more significant was the better interrelation between mothers and the health system once sickness had occurred.

In terms of fertility decline, which had been about 30 percent in the previous twenty years, there was little in the way of preexisting knowledge or practice of fertility control and apparently little in the way of latent demand. The local population had no doubt that the fertility decline that had occurred was almost entirely a product of the activities of the government family planning program, and the researchers largely concurred.

The family planning program had its most direct impact during the Emergency of June 1975 until March 1977. In this area, which differs little in this
regard from India as a whole, 86 percent of all couples classified as practicing family planning were sterilized, and sterilization probably explained well over 90 percent of the fertility decline. Although the first sterilization in the area occurred as early as 1962, half of all sterilizations during the next eighteen years were performed in an eighteen-month period during the Emergency, probably accounting by the early 1980s for two-thirds of the extent to which fertility had been depressed below its predecline level.

Even during the 1980s sterilization was adopted largely because of the persistence and thoroughness of the auxiliary nurse midwives and lady health visitors, supplemented by frequent comments by the government doctor to women with many children, or to those who had recently given birth, that they really should be sterilized for their health’s sake. There was no memory, even among the old, of the population ever having been pronatalist in the African sense. That is, most couples wanted at least two sons and a daughter to survive, but their lives were not blighted if they did not reach this target. Few were convinced that lower fertility would bring economic benefits, and, when comparing the sterilized with those who had refused, we could find little evidence of improvement except a somewhat greater persistence at school by their children. The benefits may be largely a second-generation gain. In fact, the main reason that some couples definitely decided to limit family size was the problem of keeping children at school because of the costs associated with schooling, even though there were no fees. Everyone knew that a large family of educated children would bring the greatest long-term benefits, but most found it impossible to keep children at school when they were too close together in age. It should be added that they were rarely closer together than three years because of an average breastfeeding period of two years. So there was not the fear of very close births and the demand for temporary contraceptive methods now found in Bangalore City among young middle-class couples who are greatly reducing the lactation period. In contrast, a pervasive fear of permanent health damage from sterilization weighted the scales against acceptance of family planning.

In these rather forbidding circumstances, the decisive force was the female family planning team. The team turned up regularly at every house with three or more children and argued that it was time for a sterilization. The team offered no other method, except to a small elite that knew the doctor socially. Team members concentrated on the young wife, thus breaking with tradition, but increasingly the parents of the young couple—noting the authority of government, caste, and class—allowed that fertility and family planning decisions were no longer their concern. In the course of their job the family planning workers never wavered in their conviction that sterilization would bring the family economic benefits and that the operation had no side effects, even though they seemed far less certain of this when talking privately to us.

The Hindu population was certainly affected by the fact that limiting family size was the wish of the government and of the local elite that appeared to represent it, and following the newly identified direction toward small families
was taken by them to be a mark of virtue. Indeed, this largely self-appointed local establishment, consisting of panchayat (council) members, government functionaries, teachers, bank clerks, Brahmins, Jains, Lingayats, large landowners, and successful merchants, had been instrumental in ensuring the success of the Emergency family planning program even to the extent of refusing day laborers employment unless they or their wives were sterilized. In this way they both represented the official morality of the time and ensured that the district administration was not penalized by the loss of the 10 percent of its income that would have been incurred had it failed to meet its monthly family planning target.

Interestingly, the real opposition was from the Muslim population, whose leaders claimed that Hindus have always worshipped government, whereas they had a Book of God that set out religion and morality and that would not bend to secular power. Certainly, Muslim family planning acceptance was only half that of Hindus and, as is common in India, their fertility was 10 percent higher.

Ultimately, the success of the family planning program was due not only to the assistance and persuasiveness of the auxiliary nurse-midwives but to their decisiveness when their clients wavered; they also made the bookings for the monthly sterilization camp and arranged transport to it. It might be noted that vasectomies were common before rural government surgeons were confident of their ability to perform tubectomies, but now a man has a difficult task convincing the system that he, rather than his wife, should be operated on.

Global economic and social revolution does encourage fertility decline. However, national family planning programs can accelerate the process by introducing the idea of fertility control, by legitimizing its practice, and by providing the means.

*Can Intensive Family Planning Areas Reduce Fertility Even Where There Was Little Prior Demand for Restricting Family Size?*

There is growing experience in translating findings of this kind into comprehensive and intensive family planning programs in limited areas. The best-known example is probably that in the Matlab Division of Bangladesh, where the International Centre for Diarrhoeal Disease Research has provided 89,000 people with comprehensive family planning services in the treatment area for comparison with 86,000 people in the comparison area, which has only the ordinary government services (Phillips and others 1988).

By historical accident, there had been a comprehensive experiment in the same division, in the earlier Contraceptive Distribution Project (CDP) of 1975–76, which assumed latent demand and merely provided contraception in the form of a pill saturation project. Oral contraceptive use, or at least acceptance at the door, rose quickly to 30 percent of target women and then declined, with minimal fertility impact. The subsequent comprehensive program is based on three principles: (1) Female family planning workers are recruited from each village and are selected so that they are literate, young, of low parity, have some
contraceptive experience, and are from influential families. (2) The family planning
workers are allowed a substantial measure of authority and independence
so that they really run their own system without feeling like the lower tier in a
hierarchical system. (3) There is accountability throughout the system, and
checks are made to ensure that each house is regularly visited. It should be noted
that this system is similar to those that allowed infant and child mortality to be
reduced so dramatically in Sri Lanka after 1945 and in Botswana recently. Since
1977, contraceptive prevalence in the treatment area has risen from 7 to 45
percent compared with a rise in the comparison area from 4 to 16 percent. Even
now there is great variation in levels between villages determined largely, it
appears, by the degree of commitment of the family planning worker and by the
attitudes of the local community leaders (Rahman 1986). It might be noted that
such systems depend on a pool of educated girls in each village, preferably
familiar with family planning, and this may have been made more possible by
the prior existence of the Matlab project.

Phillips and others (1988, p. 324) concluded that there was latent demand of
a kind, but that "The CDP findings lend support to the view that the provision of
contraceptive technology alone will not induce demographic change in tradi-
tional societies where demand is fragile. Rather, service demand must be
informed by the organizational imperatives of service delivery where social sup-
port for contraceptive behavior is weak." They also concluded that the latent
demand arose, despite stagnant income growth, from rising economic aspira-
tions and an increase in off-farm activities in a situation of growing market
penetration.

The Matlab experiment was important because it was carried out not only in
one of the poorest parts of Asia but among a Muslim population. Even this
success may not have been achieved but for the local knowledge that govern-
ment and public morality approved.

One such intensive area exists in Africa (De Boer and McNeil 1989), among
the 300,000 people living in the 1,000 square mile catchment area of Chogoria
Hospital, run by the Church of Scotland Mission in Meru District, 100 miles
north of Nairobi, Kenya. It is an area where a comprehensive health system,
together with other social and emotional support, has long been established.
There has been a network of satellite dispensaries through the area since 1970,
and by 1985 family planning, together with health services, was being offered
daily not only in the hospital but in twenty-seven clinics, and monthly in six
mobile clinics. Now, 34 percent of eligible women are using modern contracep-
tion, four times the level found in rural Kenya as a whole, and 50 percent say
they want no more children. The total fertility rate was measured at 5.2 at a
time when it was 8.1 in all of rural Kenya. Bauni (1989) compared Chogoria
with two other control areas and concluded that the family planning program
had succeeded because the intensive health, contraceptive, and counseling pro-
grams of the area had induced broader social change, especially in spousal
relationships. Unlike individuals in the control areas, most husbands and wives
in Chogoria now share the same beds and can easily and freely discuss family planning practice, and wives also participate in fertility control decisions. Even in the poorest parts of rural Asia and selected parts of Africa, family planning programs will work and will reduce fertility if they are embedded in a comprehensive health program with family-level counseling. To provide a Chogoria-type program across an African nation would probably mean that the health–family planning budget would cost not the 1.5 percent of gross national product (GNP) ($7 per capita) that is typical today, but 3 to 4 percent ($15 to $20 per capita). Even so, the real bottleneck might be human resources rather than money.

**Summary of the Essentially Asian Experience**

The lessons from the Asian experience are fairly consistent and agree with much of existing fertility decline theory, which is not as diverse as some of its proponents proclaim. In East and Southeast Asia, there has been enough economic and related social change to create a latent demand for restricting family size. Nevertheless, there was little prior practice of family planning, and fertility decline would have been slow in the absence of the legitimation and services provided largely by government family planning programs. In mainland South Asia, the economic case for family planning at the family level is weaker, and fertility decline has largely been the product of fairly strong governmental interventionist programs or of programs with an intense and trusted local service component (almost domiciliary care).

In both areas pronatalism is weak, and little distinction is made between government-proclaimed morality regarding fertility and morality rising from older religions. Neither of these conditions holds good in the Muslim area, extending from the eastern shore of the Mediterranean to Pakistan, and fertility there generally remains high.

Throughout East and Southeast Asia, mortality continues to decline, driven not only by medical technology but also by changes in the way medical services are provided and to a very great extent by social change, particularly female education.

An examination of time series on fertility and per capita income for Southeast Asia does little to determine which is the horse and which the cart in development. In Hong Kong, Indonesia, Malaysia, Philippines, Singapore, Taiwan, and Thailand, growth in per capita income was slower before about 1970 and has successively speeded up since. Fertility probably began to fall in Singapore from the late 1950s, in Hong Kong from the early 1960s, and more generally in the region from the late 1960s. No fertility fall occurred when there had been no prior family planning activities, although not all earlier programs were government ones. The onset of fertility decline occurred at very different per capita income levels. Perhaps one could draw the following conclusions: (1) In the right circumstances, organized family planning activities led to an earlier onset of fertility transition than would otherwise have occurred. (2) Fertility decline has
done no harm to economic growth and may have been one of the preconditions for subsequent rapid per capita increase, possibly largely because of changes in society and the family that owed something to fertility decline. (3) Income growth, fertility decline, and mortality decline may have been different facets of the same process. (4) When the Philippines experienced economic problems from 1969 onward, fertility decline ceased earlier and resumed later, but both may well have arisen from broader social and political reasons.

II. Sub-Saharan Africa

Is the Asian experience, and the theory, which is largely built upon it, applicable to Africa?

Mortality and Morbidity: Is the Decline Faltering?

Sub-Saharan African mortality levels remain, as they have been since adequate statistics first became available, the highest regional levels in the world. A World Bank report (World Bank 1989) summarized the situation as follows: every 100,000 live births result in 10,000 infant deaths, a further 10,000 child deaths before the age of five, and 500 maternal deaths. There have been fears that the position would have been greatly aggravated by slow economic growth during the past decade—even negative growth in per capita income in about one-third of all countries—and severe famines in some areas beginning in the early 1970s. This has become part of popular belief with the latest UNICEF (1989, p. 1) report, *The State of the World's Children 1989*: “Throughout most of Africa and much of Latin America, average incomes have fallen by 10 to 25 percent in the 1980s. ... At least half a million young children have died in the last 12 months as a result of the slowing down or reversal in the developing world.”

The real situation is probably not as starkly clear as this. These calculations were based on the difference, by the end of the 1980s, between mortality projected according to the mortality trends during the 1970s in ten African and six Latin American countries, and supposed actual mortality. The problem is that the Latin American countries were approaching asymptotic mortality levels, and one might have anticipated some slackening, whereas in Sub-Saharan Africa, the methods of estimation employed, in the total absence of registration data, mean that we can only talk with any confidence about retrospective trends. We have little real knowledge of actual mortality levels at the end of the 1980s, only projected figures.

The best attempts at putting these trends together have been made by Hill (1987) and by Hill and Hill (1988); the latter draws on the former, and on another study by the United Nations (1988a) and one by Timaeus (1987) on adult mortality. All make exhaustive use of specialized surveys, and Hill and Hill (1988) and the United Nations (1988a) concentrate on the secure child mortality data. The chief finding of these studies is surprising. Mortality decline has occurred at rather similar rates in nearly all African countries during the
The rate of decline in mortality has been equivalent to a gain in life expectancy of about a third of a year for every elapsed year, lower than the target of half a year that the United Nations said was globally acceptable, but nevertheless by no means discouraging. There are insufficient data to draw adequate conclusions with regard to the late 1980s, but by 1990 the expectation of life at birth had probably reached fifty-five years in Southern Africa and fifty years in the rest of the region, with West Africa catching up with East Africa. It is likely that the rate of mortality improvement has been slower in Ethiopia and Mozambique, and in Rwanda in the early 1970s. Evidence suggests that warfare and disorder rather than lack of economic growth block mortality decline. There have also been specific problems in The Gambia and Sierra Leone. This is probably evidence of the problems presented in lowland high-rainfall areas with massive problems of malaria, a thesis that finds support from the failure of Kenya to reduce mortality along the shores of Lake Victoria to anything like the low level found in most parts of the country.

A study by Caldwell and Caldwell (1987b) showed that the life expectancy in the richer half of the region’s countries was 3.5 years greater than in the poorer half. This difference was surprisingly small, considering that per capita incomes in the latter averaged only 40 percent of those of the former. Furthermore, the mortality differential could probably be explained very largely by the educational differential, itself a product of differences in resources. Nor was the change in mortality between the two groups very different, averaging in terms of annual increase over the previous two decades at 0.31 years in the poorer countries and 0.34 years in the richer ones. A comparison of the experience over the period 1965–85 of the ten countries that had experienced severe drought and famine with the twenty-two countries that had not showed an almost identical increase in life expectancy, even though the countries with famines exhibited only half the per capita income of the ones without famines. The lack of any Malthusian impact from Africa’s famines was demonstrated by an average annual rate of population growth in the former group of countries over the whole period of 2.7 percent compared with 2.8 percent in the latter, a tribute to the African experience with famine and the mobility of its people (Caldwell 1975).

The real question is why Africa has managed to sustain its mortality decline through such a difficult period over the past twenty-five years, during which per capita income has fallen in half the countries of the region. How has Ghana managed to increase its life expectancy over the last twenty-two years by about 6.5 years at an average annual rate of 0.3 years despite a decline in real per capita income of about 30 percent, a fall in the proportion of children at school, and a decline in the number of doctors per million people (many of those trained went to Nigeria, the United Kingdom, or the Middle East)? Clues may be sought from a comparison with Ghana’s neighbor, Côte d’Ivoire, which now has almost twice Ghana’s per capita income and more children of primary school age at
school, but a life expectancy still 1.5 years shorter. A major part of the answer is probably that Ghana in the late 1950s and early 1960s was spending the world's highest proportion of GNP on education, so that by 1965 it had 1.4 times the proportion of girls in primary school and 3.5 times as many in secondary school as Côte d'Ivoire. These are today's mothers. More broadly, the answer for the whole region is the driving force of social change. The proportion of children in school has continued to rise in every country except Guinea, Ghana, and Mali. The towns have grown. The market economy has continued its penetration. This has been helped by some increase in medical services. The ratio of doctors to population has risen except in Ethiopia, Ghana, Guinea, Madagascar, Mozambique, Uganda, and Zaire.

In some countries low mortality is within reach. Botswana, helped by diamonds and a stable economy to raise its per capita income to more than $1,000, now has a life expectancy of more than sixty years and an infant mortality rate of less than 50 per 1,000. Part of the answer is more doctors; their density has quadrupled over the last quarter of a century from a ratio of one doctor to almost 30,000 people to one doctor to less than 7,000. Part of the answer has been the continuing educational revolution taking place within Southern Africa in general, where more girls than boys go to school. Girls' primary school enrollment increased from 71 percent in 1965 to universal education in 1987, and secondary school attendance multiplied eleven times, from 3 to 33 percent.

The most potent force in reducing infant and child mortality has probably been the adoption of a system similar to the one that has driven the spectacular Sri Lankan mortality decline. In every community, educated local girls are selected for further extended training in a health training institute as public health workers and are subsequently returned to their communities as public health workers on central government salaries within a supervisory and consultative network. They can give health advice and even simple treatments, but their main task is to identify and visit women who are pregnant or who have young children and to advocate healthful antenatal and postnatal behavior, as well as checkups and competent child care. They help to identify sick children and ensure that they are taken to health centers, and they arrange for women to have supervised institutional births. They also advise on family planning.

It might be noted that similarly low levels of infant and child mortality are now found in parts of central Kenya where there are high levels of education and health services, and it is probably no accident that these are two of the three countries in mainland, independent Sub-Saharan Africa where fertility may have begun to decline. A similar outcome has been the result of intensive health care in selected villages of The Gambia by the British Medical Council project.

The ten World Fertility Surveys in the region revealed, on average, that 10 percent of births resulted in death by one year of age and 20 percent by five years of age. This is the highest child mortality ratio for any world region. A feature of Sub-Saharan African mortality that has long been disturbing is the high child mortality from one to four years of age relative to mortality at other ages. Of the
ten World Fertility Surveys (Benin, Cameroon, Côte d'Ivoire, Ghana, Kenya, Lesotho, Mauritania, Nigeria, Senegal, and Sudan; see World Fertility Survey 1985, pp. 64–75, and Cleland and Scott 1987, p. 1049), six showed that 45 to 57 percent of deaths occurring before five years of age took place after the child's first birthday. These were largely associated with the highest mortality, but this is not the whole explanation. Even at life expectancies of forty-five years, the wider experience incorporated in the Coale and Demeny (1966) tables showed this proportion ranging between the four families of life tables from 29 to only 43 percent (and, at life expectancies of fifty-five years, from 26 to 40 percent). Unusual levels of malaria may be part of the explanation, although the geographical spread of high toddler mortality in the World Fertility Survey does not fully support this thesis, and the suspicion must remain that a role is often played by poor weaning practices and by inadequate supervision thereafter of the share of food going to very young children.

The huge demographic, and indeed developmental, unknown in Africa is the impact of AIDS. As yet, demographers have failed to gauge the situation. For example, we know the human immunodeficiency virus (HIV) levels in East and Middle Africa with approximate accuracy only for Uganda, where admittedly the level is probably above average. In Uganda, about 7 percent of the population are HIV positive—about 1.2 million people. The periods between infection and the development of AIDS and between that and death appear likely to be shorter than the cohort data reported for developed countries. Without AIDS, Uganda's death rate probably would have been about 13 per 1,000 in the mid-1990s, but it is now likely to be about 19. That means that one-third of all deaths will be due to AIDS, and that probably AIDS will account for 80 percent of deaths in the fifteen- to fifty-five-year age range.

Yet neither the World Bank population projections issued in November 1989 (Bulatao and others 1989) nor the most recent United Nations (1988b) projections appear to take the AIDS epidemic into account. In terms of the impact on the World Bank and other agencies, an epidemic of this magnitude will necessarily dominate much planning—well beyond the health field and extending to the areas of labor force and economic development, as well as family planning.

The epidemic will in some ways be comparable only to the Black Death or to the experience for a few months during 1919 in India of the influenza pandemic. Although the AIDS epidemic may cause comparable deaths and have an immense social impact, it will in one way be very different from the Black Death. The latter occurred in conditions of an almost stationary population, and hence led almost immediately to very significant population decline. A death rate of 25 per 1,000 in Uganda would still, with a birth rate of 50 per 1,000, allow an annual growth rate of 2.5 percent unless the epidemic disorganizes society, marriage, and reproduction to a greater extent than is yet predictable.

The major impact of the epidemic is still largely confined to East, Middle, and Southern Africa. Bongaarts (1988) has projected population growth for this region as unlikely to fall below 2 percent per annum. There are now foci of AIDS
in West Africa, but we do not know as yet whether the spread of large-scale AIDS to that region is only a matter of time or whether there are real barriers to such a spread, as is suggested by recent work on the role of male circumcision (Bon-gaarts and Way 1989). Patterns of sexual networking are not decisively different between West Africa and the AIDS-affected regions (Caldwell and others 1989).

In the absence of a major medical breakthrough, one obvious defense against AIDS would be substantial behavioral change, as has occurred among the homosexual community in the West. The evidence so far is that such change is occurring in Africa on a very limited scale, partly because of a grassroots refusal to identify the disease, to agree about behavioral risk, or to recognize its incurability. Nor is the condom likely to prove of much value outside urban commercial sexual relations. There is a need for a great deal of sophisticated social science research, most of it employing methods other than large-scale surveys. We know that untreated venereal disease, especially in rural areas, exists in parts of Africa on an unusually large scale and has had a considerable effect in causing both primary and secondary sterility (Caldwell and Caldwell 1983). There is also ample evidence that venereal and other pelvic infections, when untreated and allowed to develop lacerations or ulcers, greatly increase the rate of transmission of AIDS.

From a public health stance, then, the most effective way of curbing AIDS is probably for national and international bodies to cooperate in creating comprehensive health services, partly oriented toward sexually transmitted diseases and AIDS. This would be enormously expensive and goes against much current economic ideology, but it probably would have multiple benefits in terms of controlling AIDS, reducing other mortality, and controlling fertility.

Mortality is probably continuing to fall in Sub-Saharan Africa. It is driven to a marked degree by social change and provides additional evidence of the need for placing female education very high in developmental planning priorities. The Botswanan experience shows that sufficient expenditure will greatly reduce mortality and probably lead to the onset of fertility decline. But it should not be overlooked, first, that Botswana has achieved this at the cost of almost 3 percent of its GNP or nearly $30 per capita (which for the average country in the region would represent 10 percent of GNP or half the total government budget); and, second, that this expenditure has been so effective because 9 percent of GNP is spent on education, the majority on female education (which, again, for the average country, would represent one-third of the GNP or one-and-a-half times the whole government budget). Finally, for much of the region, the expenditures necessary to control the AIDS epidemic are going to be far greater than their budgets can provide, and large-scale foreign aid will be necessary.

*The Persistence of High Fertility: Is Africa Uniquely Pronatalist?*

Africa's fertility is high, but not uniquely so, as it is subject to many constraints. The ten World Fertility Surveys revealed an average total fertility rate of 6.7. This is lower, Cochrane and Farid (1989, pp. 6–7) point out, than the
Middle East Surveys (but the latter tended to be in countries of that region with above-average fertility). What is unique about Sub-Saharan Africa is the failure of fertility to decline anywhere. In fact, Cochrane and Farid suggested that fertility has risen in seven of the ten countries, with only one, Ghana, possibly showing a slight decline. Actually, the most recent Demographic and Health Survey (DHS) for Ghana makes it doubtful whether there has been any significant decline in Ghana (Ofosu 1989). However, very recent DHS data do raise the possibility that fertility has begun to decline in Botswana, Zimbabwe, and Kenya. There is as yet little certainty, because the Botswana figures may be an artifact of methods of analysis, and those of Kenya may be a readjustment from an overestimate or an irregular upswing in fertility. If the beginning of fertility decline is real, it is significant that these three countries had to reach levels of life expectancy of about sixty years and infant mortality rates below 70 per 1,000 before it occurred. In fact, most of the Kenyan decline appears to have taken place in parts of Kenya with still lower mortality.

Fertility is falling in at least some parts of all other world regions, and the question arises as to whether in some way Africa is different. Caldwell and Caldwell (1985, 1987a, 1990), in a series of works originating in the Changing African Family Project and the Nigerian Family Study, argued that Africa is different. Because religion and family economics mutually reinforced the demand for high fertility, Africa is probably the most pronatalist of the world's regions. Lineage structure, especially in West Africa, is represented in terms of religion by the cult of the ancestors, who intervene in this life and who favor high fertility. The usual return from children that traditional societies offer to parents is reinforced by feelings of guilt, and even fear, if filial duties are not adequately performed. One reflection of pronatalism has been the deep horror of barrenness, which led to the ill-treatment of barren women and to a dread among women of either having no children or of becoming childless through the death of all their children. Our study (Caldwell and Caldwell 1978, 1987c) of all women in Ibadan City in 1973 who were completing their family size and had intentionally and successfully restricted that family to fewer than six children showed that they were subject to enormous pressures from their relatives to prevent them from acting in this way and risking becoming childless through the death of all their children. The result was that only 1.3 percent of women had taken this risk, the majority of whom had broken with their husbands and husbands' families as a result. It is of interest to note that, in fact, they had experienced unusually low mortality among their children, as apparently has been the case in one-child families in China (Caldwell and Srinivasan 1984), doubtless in both cases because of the extra care parents have shown because of their fear of child mortality.

This pervasive fear persists in Africa despite the fact that infant mortality has already fallen below 100 per 1,000, the level reached in Northwest Europe when fertility transition had already reduced the total fertility rate to little over half that currently found in Africa, and that of France to one-third of that
currently found in Africa. The onset of the French fertility decline occurred at an infant mortality rate about 300 per 1,000. The evidence is that despite the levels attained by such socioeconomic indicators as education or income, the mortality threshold for fertility decline in Sub-Saharan Africa will be well below that of other regions. Perhaps infant mortality levels of 50 to 70 per 1,000 will be required, with no more than 10 percent of all births resulting in deaths by five years of age. These are levels that few countries are projected to reach before the year 2000 and that many will reach much later. The fear of barrenness also appears as a fear of wishing for barrenness after any particular age by denying wanting any more children. This explains the uniquely small proportion of women at any parity in recent surveys who said they wanted no more (Caldwell and Caldwell 1987a, p. 413).

There are other factors in the persistence of high fertility in the region. Land has traditionally been communal and cultivated with digging sticks and hoes so that, although investment was difficult or impossible in land or farming equipment, it was possible in farm labor, usually acquired by marriage or reproduction. The lineage implies shared responsibility for the costs of children. Indeed, massive fostering of children in West Africa means that there is little relationship between reproductive decisions and reproductive economic burdens. The willingness to foster in can be taken as evidence that there is no economic loss in having children. This is compounded in West Africa for fathers by the fact that, although men and their families of origin control fertility decisionmaking and certainly the decision to cease childbearing, mothers bear the burden of most day-to-day costs. In a polygynous society there is a certain logic in each woman and her children forming a separate economic unit. Fortes (1978) predicted that the way children or their mothers were treated, or the investment made in them by fathers, would have little influence on the return to fathers from the children; we found this to be so (Caldwell 1982, pp. 65–69).

The right of the patrilineage to make fertility decisions is paid for by bride-wealth (a payment at marriage from the bridegroom’s family to the bride’s family). Thus men can make reproductive decisions with little extra economic burden in raising the children and with a resulting near certainty of support in old age (and earlier). This is a guaranteed recipe for high fertility. It might be expected that the position of women would be very different, but this is not so. Because of the weakness of the spousal economic bond, women become increasingly dependent on their children, and few feel safe without a considerable number. Thus, the majority of women, even with very large families, tell survey interviewers that they want more children. A deep fear of terminal barrenness—or at least of expressing a desire for it—means that very few women state that they want no more children.

In terms of the fertility transition, this is what makes Africa different. The lineage structure—and its accompanying beliefs in honoring living ancestors with economic support and dead ones with continuing lineage births—orient the society toward persistent high fertility. This might be undermined if, in West
Africa, there were a move toward common spousal budgets and, everywhere, if more expenditure were confined to the nuclear family, if more of it were specified for children, and if polygyny declined. It would be further undermined if there were a related move toward common spousal decisionmaking about fertility control. Family attitudinal change may be promoted by family planning programs and, indeed, by some fertility decline. However, many Africans argue that the defense of African culture and the African family is more important than fertility decline.

Caldwell and Caldwell (1985, 1988a) did not claim that fertility decline would not take place in Africa but only that Africa was sufficiently different from Asia for fertility decline there to require different thresholds—lower levels of mortality and higher levels of education and possibly income. Caldwell and Caldwell argued that twenty years ago a range of African countries scored no lower than India, Indonesia, or Thailand in a series of socioeconomic indexes, but that whereas family planning programs succeeded in these Asian countries, they did not in Ghana or Kenya. They believed that only a few African countries would exhibit fertility declines before the year 2000 and that even subsequent fertility decline would be slower than the current projections.

These views have been largely supported by Lesthaeghe (1989), Page (1988), and Frank and McNicoll (1987). Cleland and Wilson (1987, p. 26) concluded, after their historical, global survey of fertility transition, that “the indisputable strength of pronatalist sentiments in Africa poses a major theoretical challenge. It cannot be explained simply by low levels of development, educational attainment, or life expectancy.”

Recent World Bank reports have been prominent in their support of a one-world tradition, endorsed by Boserup (1985, p. 383), who maintained that the persistence of high fertility was merely the outcome of lower levels of development. Projections issued by other international agencies show that they, too, make this assumption. The World Bank (1986, p. 12) concluded that Africa was “probably not” different in terms of the acceptability of family planning and that the failure of fertility decline to begin was explained by generally lower levels of income, education, health, and urbanization. This stance was sustained in a later World Bank report (1989, p. 71), in which the authors cited supposed fertility declines in Botswana and Zimbabwe and family planning success in Chogoria, concluding that “there is increasing evidence that, where family planning services are available, contraceptive use is high.” However, Cochrane and Farid (1989), after exhaustively examining World Fertility Survey data, concluded that Sub-Saharan Africa was different and that at every economic level the population wanted more children than elsewhere.

African social and economic structures are less conducive to providing material returns to individuals or families for fertility declines than are those of Asia. Fertility decline is likely to begin in only a few countries during the present decade, and for the region as a whole it is likely to be slower than has been the experience in most of Asia or Latin America.
We need to examine at greater length just how African fertility levels are determined. In West Africa, the husband is usually now responsible for overhead costs, such as housing, which was traditionally provided by the lineage, whereas there is a considerable range in the variable cost from the wife meeting nearly all expenses to the husband—especially among the middle class—making a considerable contribution (see, on Lagos, Fapohunda and Todaro 1988). In East and Southern Africa, where women do not market on the same scale and hence are less likely to earn substantial separate incomes, there is usually a unified family budget, especially in the more patriarchal of the patrilineal societies. This should facilitate fertility decline in that there is a closer relationship between reproductive decisionmaking and subsequent economic burdens, although even here parents can make substantial claims on other relatives to help meet education costs.

Similarly, child fosterage appears to occur on a larger scale in West Africa. Employing Sierra Leone census data, Bledsoe and Isiugo-Abanihe (1989) found that in some chiefdoms, more than 50 percent of children under age two were away from their mothers. When Bledsoe and Isiugo-Abanihe investigated the ramifications of family economics in the society, they concluded that who meets the cost of African children is a very complex matter that bears little relationship to reproduction or to reproductive decisions. Page (1989) employed WFS data to calculate fosterage as measured by the residence of children away from their mothers. She found it highest on the West African coast; some 35 percent of children under fifteen were away in the southwest Côte d'Ivoire, and 40 percent of ten-to-fourteen-year-olds were away in parts of Côte d'Ivoire and Ghana (the World Fertility Survey did not include Sierra Leone). Page found little difference by the sex of children, and that migrant parents in urban areas were likely to send children under five back to the rural areas, whereas older children were more likely to be fostered to the towns for education and employment. Across Africa, she found the highest correlation with the level of marital instability, which can be translated as a correlation with a weak husband-wife dyad reflecting a stronger lineage organization—above all a characteristic of West Africa. Most Africans believe that marriages are more stable if the children present are only those of the new couple and fostered-in children, whereas each spouse's children by previous unions are fostered to their own relatives. This institution, too, should mean longer persistence of high fertility in West Africa.

Traditionally, African birth spacing, largely aimed at improving the survival chances of both children and their mothers, was achieved both by prolonged breastfeeding and by postpartum female sexual abstinence, which could last as long as three years and which was still more than two years even in the city of Ibadan in 1973 (Caldwell and Caldwell 1977). The duration of postpartum abstinence is now falling and has become particularly short in this century in parts of East Africa, according to Lesthaeghe and Eelens (1989, p. 90) because
of early and thorough Christianization, the lack of gerontocratic rulers, and the encapsulation of women in their husbands' patrilinies. One might be somewhat doubtful about the exact role of the last two conditions for West Africa and might add instead the higher level of polygyny there and hence the greater number of men with access to more than one wife. There is an associated more general recourse to marital sexual abstinence, and many women expect little sex after their mid-thirties, which probably explains why Cochrane and Farid (1989, p. 5) found abnormally high fertility under thirty-five years (resulting from earlier female marriages than in other world regions), and lower levels among older women. The important points, in terms of fertility transition, about the reduction of both sexual abstinence and breastfeeding, are, first, that the process might nullify the impact of rising contraceptive practice on controlling fertility for a sustained period; and second, that this nullification process is likely to end suddenly with the onset of fertility decline, once further contraction of breastfeeding and abstinence can have no more impact as their duration is no greater than that of postpartum amenorrhea.

Polygyny exists in Sub-Saharan Africa on a scale unknown elsewhere. Typically, more than 40 percent of married women are in polygynous unions in West Africa; between 20 and 30 percent in East Africa, and probably fewer than 20 percent in Lesotho and Botswana (Lesthaeghe, Kaufmann, and Meekers 1989, pp. 276–77). Timaeus and Graham (1989, p. 373) claim that in the nineteenth century polygyny was as prevalent in Botswana as in West Africa but has declined because of Christianization, as well as because of changes in agriculture that made women's work less valuable. Polygyny probably does little to reduce the fertility of individual women and something to maximize societal fertility by keeping all women in marriages (Pebley and Mbugua 1989). Its main impact on fertility is that it helps to sustain such institutions as child fostering and separate spousal budgets, which delay the onset of fertility transition. At the level of current polygyny found in West Africa, the institution can be regarded as universal, in that a higher proportion of women than those currently in polygynous marriages will find themselves so situated in the course of a lifetime, and nearly every woman must prepare herself emotionally and economically for this eventuality. There is little sign of a decline in polygyny in West Africa. Lower levels of polygyny with increased female education might suggest such a change, but Gaisie (1969) has shown that as educational levels have risen in Ghana, both polygyny and its differentials by education have remained stable through its incidence increasing at every educational level. Goldman and Pebley (1989) have shown that the stability of the system depends largely on the spousal age gap and widow remarriage but that it is likely to prove remarkably resistant to falls in fertility.

It has been argued that the fundamental force sustaining polygyny, and indeed high fertility as well, is the value of family labor in agriculture. In Botswana, not only has polygyny steeply declined but marriage itself is disintegrating, with half of all adult women never having married. Timaeus and Graham (1989) and
Lesthaeghe, Kaufmann, and Meekers (1989, p. 243) claim that this is a direct product of the declining importance of hand-tilled agriculture with the introduction of the plow from South Africa in the nineteenth century and the displacement of agriculture by commercial stock raising more recently. Although there are currently no great differentials in fertility by marital status, these changes may assist fertility decline.

Contraceptive use in Sub-Saharan Africa is both at a lower level than in any other world region and less likely to be related to the control of family size. World Fertility Survey data showed that efficient methods had been used by 6 percent of women in Sub-Saharan Africa, compared with 32 percent in Asia, 37 percent in North Africa, and 50 percent in Latin America. The region’s level of current use ranged from 6 percent in Ghana to 5 percent in Kenya; 3 percent in Lesotho and Sudan; 1 percent in Benin, Cameroon, Nigeria, and Senegal; and 0 percent in Côte d’Ivoire and Mauritania (Cochrane and Farid 1989, pp. 26, 90). Supplementing these data with others from the Contraceptive Prevalence Surveys and the Demographic and Health Surveys, Page (1988, p. 33) has calculated the current use of modern contraception for various dates, most in the 1980s, as 28 percent in Zimbabwe, 19 percent in Botswana, 10 percent in Kenya, 6 percent in Ghana and Liberia, 3 percent in Lesotho, and 1 to 2 percent in most other countries. Caldwell (1975) had assessed the use of modern contraception in Middle and West Africa in 1970 at about 125,000 women or 0.5 percent and had projected 1980 levels as 1.6 percent with no further development of family planning programs, 3.1 percent with considerable development, and 4.7 percent with programs of the Indonesian type. The actual level reached in 1980 appears to fall between the first and second projections. Many contraceptive methods are not as yet particularly acceptable in Africa. Mauldin and Segal (1988, p. 341) show that even of Africa’s limited use of contraception, only 10 percent is sterilization (nearly entirely female, because of prohibitive cultural pressures against vasectomy), compared with 45 percent in all developing countries, whereas another 10 percent is the intrauterine device (IUD), compared with 24 percent in all developing countries. Indeed, only the birth-control pill has been found to be particularly acceptable, at a level of 40 percent in contrast to 12 percent in the developing world as a whole. The very low level of acceptability of condoms bodes ill for their use against AIDS. Success in African family planning programs probably depends on much higher levels of use of IUDs and tubectomies.

The relationship between the use of family planning and the desire to control ultimate family size, assumed by family planning programs in Asia, does not hold in Africa. The family planning services may meet a social need without doing very much to limit family size. In southwest Nigeria, the Changing African Family Project (Caldwell and Caldwell 1976) found that 40 percent of first contraceptive use was to substitute for postpartum sexual abstinence, with the obvious possibility of raising fertility, while other major uses were to prevent conception during premarital or extramarital sexual relations or after terminal
abstinence was supposed to have begun. Only 11 percent of contraceptors in Ibadan City had begun to use contraception with any thought of controlling family size, and, at the time of the survey, only 17 percent were employing it for this purpose. As only one-sixth of Ibadan women had ever practiced fertility control, this was 3 percent of all women. The fairly high nonmarital use of contraception arises from the fact that premarital and extramarital sexual relations are not proscribed in the region to the same extent as in Asia (Caldwell, Caldwell, and Quiggin 1989). Nichols and others (1986) showed in Ibadan in 1982 that among secondary school students over fourteen years of age, 60 percent of boys and 38 percent of girls had been sexually active. This means that African family planning programs have to be much more oriented toward the young than in Asia, although such orientation meets with considerable opposition.

Bongaarts (1987, pp. 134–35) reported that African countries did not follow the relationship between contraceptive prevalence and fertility found in the rest of the world. That formula suggested a total fertility rate for Kenya in 1977 of 6.4, whereas 8.1 was actually recorded, and for Zimbabwe in 1984 of 4.5, although 6.5 was found. Kenya, in fact, had experienced rising fertility over twenty years as contraceptive prevalence increased. Part of the explanation is uses of contraception for other purposes than controlling family size, and part is the fact that fertility is not as restricted to marriage as in most of the developing world. Nevertheless, Cochrane and Farid (1989) concluded that if all information about marriage, abstinence, breastfeeding, sexual activity, and contraceptive use were put together, then the region's fertility should be higher than recorded, and they suspected the cause to be abortion, sterility, subfecundity, and spousal separation.

In fact, all of these factors play a role. Abortion occurs on a considerable scale, especially to permit schoolgirls to continue their education and to allow wives to hide extramarital conceptions (Caldwell and Caldwell 1978). Primary sterility is a major problem in Middle Africa, where fertility may rise as health services improve; and secondary sterility after ten or fifteen years of marriage is probably widespread (Caldwell and Caldwell 1988b). Many wives have little or no sex after their mid-thirties even if spousal separation has not taken place (Caldwell, Caldwell, and Quiggin 1989).

In many African countries the value of family labor in agriculture still keeps levels of both polygyny and fertility high. This is reinforced by mechanisms that weaken the relationship between fertility and the economic burden arising from it—for example, weaker emotional and economic ties between spouses than between each and their lineages, separate budgets for spouses, and massive child fosterage. All are related to polygyny, and, like polygyny, are most prominent in West Africa, thus helping to explain why West African fertility decline may be slow. African levels of contraceptive use are low, and most use is not aimed at controlling family size. The use of IUDs and tubectomies is particularly low, a fact that militates against early fertility transition, as these are the major means
by which contemporary developing world fertility transitions have been achieved.

The Success of Population Policies: Why Is Africa Different from Asia?

National family planning programs began in Kenya in 1968 and in Ghana in 1970, dates comparable with those of Southeast Asian programs, although the success in controlling fertility has been much less in the African countries. This lack of success has been described as arising from a lack of efficiency in the African programs, although Caldwell and Caldwell (1988a) have argued that it is demand that drives such efficiency. They have identified lack of demand to control family size and an unwillingness of administrators and politicians to be identified with failure and with promoting programs reportedly at odds with the African way of life. Caldwell and Caldwell also argued that African governments would never be able to impose Chinese-type family planning programs or even ones more like those in India or Indonesia, because of the newness of African national states; a related lack of Confucianist or Brahmanical traditions of state or elite leadership, especially in areas of personal and moral sensitivity; and a strong belief that individuals and communities know more about the morality of fertility than do governments, because fertility is the central concern of traditional religion.

At the governmental level there has been a major shift toward approval of fertility control, as is shown by comparing policy statements at the 1974 Bucharest and the 1984 Mexico City World Population Conferences. The Economic Commission for Africa (1989) reports that between 1977 and 1987 the proportion of African governments claiming that their population growth rate was too high climbed from 34 to 59 percent and that those stating that they had policies to curb excessive population growth rose from 23 to 46 percent. Lesthaeghe (1989, pp. 475-76) ascribes these changes to increasing concern over food crises and lack of economic growth and to the hope that successful population policies will help to overcome these crises, together with the realization that traditional African birth spacing through postpartum sexual abstinence is being eroded. Because one-fourth of the population of Sub-Saharan Africa lives in Nigeria, a good deal hinges on just how that government implements its new population policies and on just how successful the implementation proves to be.

Caldwell (1982) has suggested that fertility decline depends to a considerable extent on the increasing emotional and economic nucleation of conjugal relations, and this interpretation is supported for Kenya by Frank and McNicoll (1987, p. 231ff.). Lesthaeghe (1989) is skeptical about whether the required Westernization of the family is taking place, but his view of the future is not very different (p. 36): “One can expect a close relationship to emerge between the regional pattern of fertility transition and the geographic spread of Christianity, with education acting as a major intermediate variable.” The position may be more complex than this in that coastal West Africa has been no less enthusiastic about the Christian message than East or Southern Africa, but—either because
there were fewer European settlers or because West African cultural institutions were more resistant—that message has not been so closely related to family change. Lesthaeghe (1989, p. 149) also reports that his quantitative analysis has provided some consolation for economic determinists by showing that economic development has a strong effect on contraceptive use. Sindiga (1985, p. 175) believes that family planning programs in Africa will be more successful if they admit the dominant role of men in Africa and design their interventions accordingly. The World Bank (1989, p. 72) says that ultimately it will be a question of money, and that programs to be successful will need to spend 0.6 to 0.8 percent of GNP or perhaps 5 percent of the national budget, an amount similar to that usually allocated for health.

African governments are changing toward antinatalist policies faster than the societies they represent. Indeed, it is the fear that their constituents will not follow their lead that gives rise to weak and often confused programs. It may well ultimately be a question of money, but it is very doubtful whether the critical expenditure is 0.6 to 0.8 percent of GNP. The fact that African fertility decline is so dependent on massive child mortality decline, and the resource outlays needed in Botswana and Chogoria in Kenya, suggest that the combined health and family planning figure could be for many African countries 3 to 4 percent of GNP or typically two to three times the size of current health budgets.

Population Projections: Are We Now Guided by Realistic Estimates?

The World Bank released its latest population projections in November 1989 (Bulatao and others 1989), showing Sub-Saharan African population growing from 444 million in 1985 (9 percent of the world’s population) to 1,907 million in 2050 (19 percent); 2,535 million in 2100 (22 percent); and soon after, in conditions of stable global population, to 2,614 million (23 percent).

The mortality projections are, in one sense, not surprising, because they assume the continuation of the trends of the last four decades, with annual gains in life expectancy of about one-third of a year per elapsed year from a level of about fifty-two years now to sixty-five years by 2030. What is surprising is the inability still to face the AIDS crisis. For example, Uganda’s 1995 crude death rate is projected to be 13 per 1,000, with consequent natural increase of 3.1 percent per annum, whereas in reality the death rate will probably be at least 19 per 1,000 with natural increase about 2.5 percent.

The fertility projections are much more radical and assume quite sudden and dramatic change, with net reproduction rates in Sub-Saharan Africa reaching unity—a level attained in the West temporarily during the Depression of the 1930s and probably more permanently in the 1970s, after a century of decline; by 2010 in Botswana; 2015 in Zimbabwe; 2020 in South Africa; 2030 in Lesotho and Namibia; 2035 in Benin, Ghana, Liberia, Madagascar, Sudan, Swaziland, and Togo; and, last, by 2060 in Niger. This implies fertility declines between 1985–90 and 1990–95 in twenty-eight (almost 60 percent) of the countries covered; no change in fourteen (almost 30 percent); and increases, as
sterility problems are overcome, in six (more than 10 percent). By 2000 to 2005, a little more than a decade from now, falls of 24 percent or more are projected for Benin, Botswana, Ghana, Liberia, Madagascar, Namibia, South Africa, Swaziland, Togo, and Zimbabwe. Indeed, the two latter, with declines of 42 and 43 percent, are shown with levels about 25 per 1,000 and rates of decline equal to those reached by Thailand between 1965 and 1985 (Knodel and others 1987, p. 56).

Various points are noteworthy. The projections place great emphasis on the first reports of change in Botswana and Zimbabwe, although there has been little in the way of confirmatory analysis or follow-up surveys. They also back hunches about fast declines in a range of West African coastal countries much changed by foreign contact and in the highly Christianized Southern African countries, which are, in addition, affected by the South African economic system. They may well underestimate the strength of institutional resistances in West Africa. They do not agree with Lesthaeghe and colleagues' thesis (1985) that Kenya—with its low mortality, socioeconomic change, Christianization, and early family planning program—will be a front-runner. I share the skepticism of Page (1988, pp. 31-32) about whether change can be as rapid as this, but I note that the United Nations (1988b) shares the World Bank's optimism. The United Nations' total projected population for the region is, in fact, 1 percent below the Bank's projection in the year 2000, although 4 percent higher by 2025. The United Nations achieves this effect less by identifying front-runners than by postulating general fertility decline, so that by the year 2000 the United Nations gives Botswana, Ghana, Togo, and Zimbabwe all birth rates around 44 (births per annum per 1,000 population), whereas the World Bank suggests 25, 28, 38, and 39, respectively. However, the United Nations shows fertility falling everywhere, whereas the World Bank envisages delays in many countries and postulates initial rises in others. The other difference is that for the period 1985-90, the United Nations begins with a regional life expectancy of fifty years in contrast to the Bank's estimate of fifty-two years.

The U.N. projections may possibly be right for the whole region, but they cannot possibly be right for individual countries, for the rather mechanical projections show, with few exceptions, declines in national total fertility rates of approximately 5 percent in the first ten years after 1985–89 and 50 percent or a little more in the first thirty-five years. Thus Botswana, Ghana, and Zimbabwe move at a slightly slower pace than Chad, Niger, or Sierra Leone. The United Nations does select two front-runners with falls of 60-62 percent in thirty-five years: Kenya and, rather curiously, Burundi. It anticipates a rise in fertility in only one country, Gabon, and it offsets the general fertility decline by a rather steeper mortality decline than does the World Bank. Thus, life expectancy henceforth is projected to rise by 0.4 years per elapsed year (about 25 percent faster than in the last four decades), with some slackening after sixty-five years is attained.

In contrast to the picture presented by the latest World Bank and U.N. popu-
Table 1. Population Growth and Economic and Social Indexes, Independent Sub-Saharan African Countries with mid-1987 Populations Exceeding 1 Million

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<tbody>
<tr>
<td>Less than 2.5(^a)</td>
<td>0.7(^{(1)})</td>
<td>58(^{(3)})</td>
<td>25,786</td>
<td>1.4(^{(8)})</td>
<td>6.0</td>
<td>50</td>
<td>412(^{(11)})</td>
</tr>
<tr>
<td>2.5–3.0(^b)</td>
<td>0.1(^{(2)})</td>
<td>63(^{(4)})</td>
<td>22,438(^{(6)})</td>
<td>1.0(^{(9)})</td>
<td>6.6</td>
<td>50</td>
<td>357</td>
</tr>
<tr>
<td>More than 3.0(^c)</td>
<td>1.1</td>
<td>97(^{(5)})</td>
<td>10,780(^{(7)})</td>
<td>2.0(^{(10)})</td>
<td>6.6</td>
<td>54</td>
<td>688</td>
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*Source: World Bank (1989).*
lation projections, there is little evidence that we are about to witness a widespread onset of fertility decline in Sub-Saharan Africa. Most research comes to the opposite conclusion, partly because of a lack of economic returns to individuals from restricting family size, and partly because African governments are likely to prove unwilling or unable to implement Asian-type family planning programs. On the basis of past experience, one might forecast declines beginning somewhat later and perhaps of no more than half the steepness of the projections. Certainly they will begin in some countries well before others, as the World Bank suggests. West Africa is likely to offer greater cultural resistance to fertility decline than either group of projections suggest. However, the AIDS epidemic may mean that the past is no guide to the future, for it may have an impact on marriage, and through it on reproduction, and it may bring into existence health services that reduce child mortality more rapidly and so accelerate fertility decline.

Do Sub-Saharan African Countries Benefit from Slower Population Growth?
A Crude Analysis

Table 1 examines the relationship between the rates of population growth during 1965–80 and per capita income growth and various other measures during the late 1980s that demographic-economic theory suggests should be affected. The anticipated linear deterioration in other measures as population growth increases does not appear. Instead there is a U-shaped curve in income growth, health expenditure, and secondary schooling, and a linear increase in primary schooling and the density of doctors. Clearly, the social measures are most affected by preexisting income levels, whereas little can be said about the determinants of income growth.

There are major problems in carrying out this kind of analysis in the region. Because the region is pretransitional, there is little difference in the level of fertility between the growth-rate categories. Instead, rates of population growth are largely determined by mortality and migration levels. Thus, fewer doctors and lower levels of primary schooling might be expected to yield higher mortality and hence lower population growth rates. In addition, lower rates of population growth can be the product of emigration arising from a faltering economy, whereas high rates of population growth may reflect the attraction to immigrants of a rapidly growing economy. Furthermore, population growth arising from the arrival of energetic, and sometimes skilled, adults may assist rather than retard economic growth. It is noteworthy that three of the major emigrant countries of the 1965–80 period are found among the low-growth-rate group, Burkina Faso, Ghana, and Mali, whereas two of the chief immigrant countries, Côte d'Ivoire and Gabon, are in the high-growth-rate group. In fact, the average rate of natural increase of the first three was higher during this period than that of the last two.

Table 2 makes a second attempt to examine the situation. This time the focus is on the rate of natural increase halfway through the period, for it is this rate
that helps determine the level of child dependency, which, if high, is held, in the dominant economic demographic theory, to be disadvantageous. This time, Mauritius, with its island location and completed demographic transition, is omitted as of little relevance to the rest of the region. The level of natural increase is merely dichotomized because it does not exhibit the extremes that population growth does.

Once again, the countries that provided doctors achieved lower mortality and higher rates of natural increase. Even that position might change because by 1987 the countries that earlier had lower levels of natural increase were spending a higher proportion of GNP on health and had marginally more children in primary school. However, the significant difference in per capita income growth is noteworthy. It cannot be reproduced in table 1 by dichotomizing that table. There remains the possibility, of course, that, with only thirty-four countries, the result is merely an artifact of coincidentally different histories, economic polices, and natural resources. Nevertheless, it seems likely that lower levels of natural increase do favor growth in per capita income even if they are achieved not by the control of fertility but by its depression by unusually high levels of sterility (as in the cases of Cameroon, Central African Republic, Chad, and Gabon, although the first and last almost certainly have high per capita income growth rates because of oil and other minerals) or by its offsetting by high mortality levels. Continued high mortality is not the route, however, to better living standards, because in Sub-Saharan Africa, unlike in earlier Europe, even moderately high mortality reinforces the persistence of high fertility, whereas mortality itself nevertheless gradually falls. If there is an inverse relationship

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**Table 2. Level of Natural Increase and Economic and Social Indexes, Independent Sub-Saharan African Countries (except Mauritius) with mid-1987 Populations Exceeding 1 Million**

<table>
<thead>
<tr>
<th>Average annual per capita income growth, 1970–75 (percent)</th>
<th>Percentages of relevant age group at school, 1986</th>
<th>Number of persons per doctor, 1984</th>
<th>Percentage of central government expenditure spent on health, 1987</th>
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<tr>
<td>2.5 or less&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.4&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>69&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td>15&lt;sup&gt;(2)&lt;/sup&gt;</td>
</tr>
<tr>
<td>More than 2.5&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-0.4</td>
<td>73&lt;sup&gt;(3)&lt;/sup&gt;</td>
<td>18&lt;sup&gt;(3)&lt;/sup&gt;</td>
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<sup>a</sup> Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Congo, Chad, Ethiopia, Gabon, Guinea, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mozambique, Senegal, and Sierra Leone.


between population growth and economic growth, it would merely delay the economic crisis.

**What Does the Future Hold, and Which Developmental Policies Should Be Adopted?**

Demographic-economic theory does not provide a particularly good guide for development policy. On the whole, its findings have not been sustained by historical experience. A surer guide might be provided by two commonsensical observations. The first is that in the course of development to a degree of affluence, the history of countries now developed shows both that per capita income rose and that family size declined. It seems likely that each change was helped by the other in subtle interactions that are not captured by existing theory. It is reassuring that modern Western history shows very substantial declines in infant and child mortality immediately subsequent to the first fertility decline. The second consideration is that much of Sub-Saharan Africa suffers from poor soils and has little in the way of large alluvial valleys suited to irrigation. Hence, it seems unlikely that the attainment of adequate diets and an agricultural surplus for export would be assisted by a multiplication of population of more than the sixfold increase suggested by current population projections, themselves characterized by a surprising belief in the immediacy of fertility decline.

It would be unwise to assume that economic growth in the region will be much better in the immediate future than it has been in the immediate past. That means that improvement in per capita income will need all the marginal support that social and demographic change can provide. It also means that continued mortality decline, which surely must remain a central developmental objective, will need to be sustained by social change and by a more democratic and efficient distribution of the health services that can be afforded. The form of social change that yields the greatest results in mortality decline and that may be the most certain road to fertility decline is education—especially female education—and development seems to demand major inputs into this area both for direct benefits and for indirect ones via demographic change.

In terms of the power of forces tending to sustain high fertility, Sub-Saharan Africa is probably unique. One powerful support for high fertility is the nature of family economics, which, especially markedly in West Africa, tends to diffuse the cost of children and even to place it predominantly on those who do not make the fertility decisions. The route to low fertility lies either through a greater conjugality in the economic burden, and a greater concentration of economic gains and losses within the nuclear family, or perhaps in a movement toward women taking responsibility for fertility control decisions. In either case, this means the kind of social change that can only be promoted by an intensive grassroots family planning program. It may be that the success of such programs will have a direct economic impact, in that family emotional and economic nuclearization, stronger conjugal emotional and economic links, and a down-
ward turning of the wealth flow toward children are the preconditions for sustained economic development. Such changes will happen more easily in East and Southern Africa, for the West African family system is still structured to provide few immediate returns for fertility decline. However, it should be noted that Mason and Taj (1987), after reviewing the reported global evidence, concluded that there was little to show that women were likely to desire fertility control earlier than men, a conclusion that may hold for Africa as well, because the economic independence of African women means that in old age they are very dependent on their children.

It is also clear that Africa's cultural context and family economic systems make it likely that the child mortality threshold will be at lower levels of mortality for the onset of fertility decline than has been the case elsewhere. If a great deal of investment in fertility control is not to be wasted, then there would appear to be a case in Africa for combined intensive maternal and child health and family planning programs. There is already evidence that such programs can work, but they require not only a sufficient density of local health services in rural areas and among the urban poor but also the employment of trained health and family planning workers to visit households regularly. Such programs are easier in the areas where malaria is less intense, and the latter may once again require world attention.

All planned efforts in Africa are rendered more complex and more urgent by the AIDS epidemic, which is already massively affecting areas such as southwest Uganda and threatening to have a major impact on health and distort the societies and economies of much of East and Southern Africa within the next decade. This is a development challenge of unprecedented magnitude, and history will not easily forgive us if we are not prepared to spend massively in ameliorating the effects of the disaster. In the absence of a decisive medical breakthrough, the most efficient way of spending such money would seem to be on universal and comprehensive health services that could clear up pelvic infections early and reduce the rate of transmission of pelvic disease. The upgraded health system will also be needed to detect HIV infection and to assist AIDS victims.

There is no real conflict in using this intensive system also to reduce child mortality and to provide family planning. Indeed, the kind of social changes that may accompany marital fertility control may also be the necessary changes to reduce the extent of sexual networking.

One reason for a need to combine family planning with programs to reduce infant and child mortality, and the reason for employing, as the major instrument for both, intensive local services, is the fact that African governments will not be able to create the kind of family planning programs that have worked in China or even in India and Indonesia. In the words of Frank Notestein, such programs would be more likely to result in the fall of governments than of the birth rate.
Although it is likely that there is no fundamental conflict between battling the AIDS epidemic and continuing and intensifying fertility control efforts, it is curious that so little has appeared in the literature to show that much thought is being given to the subject.

What, then, might be the immediate targets in Sub-Saharan Africa for program inputs in the population field?

1. We probably have to conclude that the way to a modern economy, and to bringing the type of society compatible with it into existence, lies through fertility decline. Given the weakness of the health infrastructure, this means a need for government programs that can certainly learn from the Asian experience. Government involvement is also needed to legitimize the control of family size, and especially to legitimize the use of IUDs and female sterilization. The sooner every country of significant size has its own Chogoria to prove that fertility can be reduced, and to provide a model for expansion, the better.

Although government programs are absolutely necessary in the region, the weakness of governmental service networks means that full use should also be made of the private sector in the form of doctors, other health personnel, or commerce. The most significant service function of the private sector would most likely be to distribute oral contraceptives and to further the concept of small families.

2. All research has shown that both fertility and child mortality decline are strongly accelerated by female education. Africa could do better in the area of girls' education, and indeed in all education. An unweighted average of all countries in the region shows in 1986 for primary school 91 percent of boys attending compared with only 63 percent of girls (comparable Asian figures are, for India nearly all boys and 76 percent of girls, and for Indonesia universal attendance by both sexes). In Africa 27 percent of boys and 13 percent of girls are in secondary schools (in India, the respective figures are 45 and 24 percent, and in Indonesia 45 and 34 percent). These figures are not all dictated by economic levels. Among the poorer half of Sub-Saharan African countries (as measured by per capita incomes), Madagascar, Mozambique, Tanzania, Togo, and Zambia have more than 70 percent of girls in primary school, whereas Madagascar has 30 percent in secondary school. For a range of demographic and other development reasons, furthering education—especially that of girls—should be given high priority.

3. In much of rural Africa health services are still rudimentary. In any circumstances, there would be a strong case for concentrating collaborative aid in this area. The case is strengthened by the extent to which any fertility decline is dependent on lower child mortality, and it is rendered overwhelming by the emergence of the AIDS epidemic. The latter will almost certainly move to center stage during the coming decade in terms of African developmental and aid policies. The world finds it easy to be alarmed by this unprecedented crisis but surprisingly difficult to plan for it.
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Caldwell, 249


Comment on “The Soft Underbelly of Development,” by Caldwell

Ron Lesthaeghe

My first reaction to Caldwell's paper was actually to its title. Why should demography or demographic transition be the “soft underbelly” of development? Although I am by no means an expert on development economics in the strict sense, I imagine that any historian reviewing economic prescriptions for development since World War II would come up with major contradictions in that field as well. It is quite some distance from early theories stressing industrial development through large-scale public works or investment in heavy industries to more recent concentrations on basic needs and now on structural adjustment. It seems therefore that the creature of “social and economic development” has more than one soft underbelly and that demographic transition may not be among the “softest.”

This by no means implies that contemporary demographic policies are able to draw on a neat and tidy body of theory that is comfortably supported by empirical evidence. In fact, the less than perfectly clear historical record of the currently industrialized nations on the link between demographic and economic change gives ample warning of the difficulties to come when analysts shift to development on other continents.

Caldwell's lucid paper, laid out in no fewer than twelve questions and accompanying suggested answers, testifies once again to the complexities of the linkages between demographic and economic change. I had little difficulty in subscribing to most of Caldwell's premises, but this should come as no surprise, because author and discussant both adhere to an intellectual tradition of social demography that pays ample attention to the historical contexts of patterns of social organization and culture and that does not divorce policy proposals and evaluations from these contexts. Consequently, our tradition has a definite historical, anthropological, and sociological flavoring, and it makes ample use of cross-cultural comparative analysis.

To be more precise, the tradition of social demography is intrinsically interested in the effects of changes in the socioeconomic structure—such as the growth of the wage sector, the economic roles of women, urbanization, alterations in land tenure and agriculture, the restructuring of social stratification

Ron Lesthaeghe is dean of the Faculty of Economic, Social, and Political Sciences at the Free University of Brussels.

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systems, and education—on demographic factors that condition population growth and distribution. These effects operate through a variety of channels that are often connected to changes in the structure of community and of kinship or household organization. Because this gives rise to a plethora of possible contexts, I completely fail to see why a single and simple "universalistic" or global theory of demographic transition should hold. Hence, both of us harbor a deep skepticism toward universalistic policy prescriptions worked out on the basis of any currently fashionable economic doctrine.

The basic criticism of our relativistic line of thought is that it sacrifices economic efficiency for the sake of sociological understanding. This allegation is unjustified. As Caldwell's paper shows, cross-cultural comparisons have yielded variables that have an impressive record in producing demographic change. The first of these is undoubtedly education, and female education in particular, because it cuts deeply into the fabric of lineage, community, and household organization and fosters individual autonomy in reordering priorities and in making choices. Education and female schooling have and remain therefore closely associated with declining infant and childhood mortality, later ages at marriage, and a faster fertility transition. But again, one should not look for convenient thresholds, because other contextual variables are bound to alter the size of the effects and can even temporarily change their sign as well. Schooling can serve the cause of individual autonomy, but it can also serve traditionalism, so the politics concerning the control of educational institutions enter into the picture as well.

A second crucial variable, equally singled out by Caldwell, is the structural transformation of the household economy. This variable responds not only to broader structural transformation (generally moving away from the household as a unit of production) but also to social patterning of gender relations. Although William Goode (1963) holds that household systems show a global tendency of converging to the nuclear family pattern, with more egalitarian gender relations, I feel that there is still ample room for new patterns to crystallize that definitely do not resemble the Western pattern. Africa again is where Goode's evolutionary thesis is least appropriate, as Caldwell also makes clear. Hence, a careful monitoring of how family and household systems evolve in different contexts and of their effects on demographic variables will not yield a simple picture.

So far I have sketched the points in Caldwell's summary of the state of the art with which I am in agreement. I now turn to elements to which I think he has not given due attention.

Caldwell's world seems to be split into two—societies with nonfamilistic religions and patterns of gender relations that easily accommodate pressures toward reducing the demand for children, and societies with strongly pronatalist cultures and patterns of social organization. The Islamic world and Sub-Saharan Africa squarely fall in the latter category. So far, I have no basic problem. The current demographic record speaks for itself.
But now I would like to introduce some caveats. First, standard demographic projections assume an uninterrupted decline in fertility to replacement level. But there is evidence that societies with more openness to fertility control are at risk of going through a "halfway transition," in which the demand for children definitely declines but in which many individuals want and need fertility levels substantially above replacement. Several cases are on record in which an initial fertility decline stalled between total fertility rates of 3 and 4.5 children and contraceptive prevalence between 45 and 65 percent (see Bongaarts 1986, p. 21). These cases include countries with large populations, such as Brazil, India, Malaysia, and the Philippines, or countries with relatively early declines, such as Costa Rica and Sri Lanka. Historically, also, France went through a marked stepwise decline with an intermediate plateau between 1835 and 1880. In my opinion, the populations of Sub-Saharan Africa—if they do experience an initial fertility decline during the 1990s—are also likely candidates for a halfway transition, because the utility of children is likely to remain well above that witnessed in Western countries or in the Far East, and because more coercive forms of family planning stand no chance of success.

My second reservation about Caldwell’s paper is that it does not envisage an incipient fertility transition in response to economic hardship or crisis. This possibility has been resuscitated by Boserup (1985) specifically for use in the Sub-Saharan context. The thesis goes against the grain of classic demographic transition theory but not against that of empirical evidence. The first third of the French fertility decline occurred in tandem with a substantial fall in household income. The rapid rise in contraceptive use in Brazil’s northeast is associated with emigration and economic crises. And the beginning of a fertility decline in central Kenya (and outside the laboratory setting of the comprehensive health system serving the 300,000 people living in the catchment area of Chogoria Hospital) came when migration opportunities dwindled, returns from investment in education sagged, and the economic growth rate of the nation slackened. At present, I would not discount the “crisis-led transition,” because rising relative child costs and frustrations with respect to future opportunities may equally operate in the direction of a partial fertility decline, especially where the transition started with an initial fertility bulge (associated with declining breastfeeding, postpartum abstinence, and overall child-spacing)—that is, especially in Sub-Saharan Africa.

A third point I missed in Caldwell’s paper is that it lacks a section dealing with the other pronatalist world: the Islamic countries. Although these nations exhibit a great deal of heterogeneity with respect to policies and economic setting, it is still obvious from a demographer’s point of view that they have been lagging behind in the fertility decline. It is also not hard to argue that this is associated with the strength of traditional gender relations and low levels of female education relative to that of males. Yet there may be more movement in Islamic settings than is perceived from the outside. The debate on individual autonomy versus religious strictness is fully emerging in an important number of
Arab countries and, in combination with an economic crisis in a number of them, is apparently producing a fertility decline as well. For example, Fargues (1989) shows that birth rates have been steadily falling in Tunisia since 1965 and in Algeria since 1975. In Tunisia, the total fertility rate of 6.9 children in 1966 had fallen to 4.9 children in 1981. In Algeria, the total fertility rate was 8.4 children in 1970 and 5.4 children in 1986. A number of classic relations hold. Both countries have considerably reduced female illiteracy; age differences between the spouses at marriage have declined; and female ages at marriage have gone up significantly. Nonfarm and nondomestic female employment, however, has evolved much less. It also seems that the Tunisian fertility decline lost momentum in the 1980s, whereas the Algerian one has been quite spectacular from the early 1980s onward.

I have introduced the notions of halfway transition and crisis-led transition to show that outcomes can be produced that again defeat standard textbook notions of demographic transition. They actually add grist to Caldwell's mill in contending that policy-relevant wisdom is not readily transportable from one setting to another, but that investment in female education is still the best bet in most cultural contexts and economic situations, provided that female education fosters individual autonomy and remains outside the control of traditionalistic doctrines.

A word should also be said about Caldwell's view concerning the primary role attributed to what he calls the latent or underlying demand for contraception and family planning services. At several places in his paper, Caldwell stresses that family planning programs are only successful if they correspond to an emerging need. Yet he also singles out family planning experiments in two typical "pronatalist" project settings (that is, the Matlab project, providing comprehensive health care services for some 89,000 people in Bangladesh, and the Chogoria project in Kenya) to document that success is still assured provided that one is willing to invest enough money and human resources in such projects. The Matlab and the Chogoria experiments could have been picked up by a Caldwell adversary to document the point that a demand for contraception can be generated in culturally adverse conditions provided that one tries hard enough.

I think that these experiments show little either way. It is attractive to use an experimental research design, because a number of confounding variables can be brought under much better control than in cross-cultural or cross-regional experimental designs, but a problem arises when resources are continuously pumped into the experimental area until some effects emerge. Caldwell admits that the resources used in these two experiments are far above those available or even producible at the national level, from which I would conclude that the experiments have failed. A much better design would be one in which the resources devoted to the experimental area were limited to what can reasonably be mustered on a national level. I fear that the Matlab and Chogoria outcomes
would then have been quite different and more in line with the less spectacular results of other experimental designs that are not reported in Caldwell's paper.

Most of my comments have pertained to the demographic transition aspects of Caldwell's paper and not to the second subject he deals with—the economic effects of population growth. From the historical record (once again) it is obvious that economic development owes much more to nondemographic factors than to population growth rates (contrast France with England, for example), and I am not surprised that this apparent conundrum about population growth and economic performance has been carried forward in time. Although rapid population growth (say, rates above 2.0 percent yearly) is a risk factor, I must admit that the historical evidence with respect to pessimistic predictions regarding food production, unemployment, or slower increase in national income have not come out in a systematic way. Nor would I reckon myself among the optimists who view population growth as a motor of technological adaptation. Rather, I would prefer to judge each outcome according to the complexity of each situation. To sum up, I find the grand debate singularly unhelpful, and, to make matters worse, it has concentrated too much on economic performance to the detriment of ecological issues.

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I wish to congratulate Professor Caldwell for being, as always, insightful and thought-provoking and for providing us with a broad sweep of the field. I cannot possibly address all his propositions. I have therefore selected three that I think are most central.

Let me start by being contradictory, because that is always easiest. I wish to disagree with Caldwell's pessimistic view that a fertility decline in Sub-Saharan Africa is unlikely. In contrast, I believe that recent evidence suggests that a fertility decline has already begun in Sub-Saharan Africa, a decline that may be associated with changes in family-size preferences that are related in part to poor economic growth, in part to the history of mortality reduction and educational expansion in the successful countries, and in part to good family planning services. I agree with Caldwell's rough estimates on the high levels of health expenditures needed to stimulate fertility decline, but I would add, again more optimistically, that all these costs need not be borne by the local governments. I do agree with Caldwell that mortality decline is an important prerequisite for fertility decline, and that the epidemic of acquired immune deficiency syndrome (AIDS) may change the population balance.

Second, I want to briefly discuss the economic consequences of rapid population growth.

Third, I want to concur with him on the importance of the problem of AIDS, but I will suggest some slightly different policy implications relating to economic growth because of weight that should be given to its cost in forgone income.

**Fertility Decline in Sub-Saharan Africa**

I believe that fertility decline has begun in Sub-Saharan Africa. Its expansion is perhaps uncertain, but there are hints that it has even begun in the western part of Sub-Saharan Africa. Five years ago I was much less optimistic. The scarcity of data in Sub-Saharan Africa has always plagued researchers, but two rounds of fertility surveys have become available over the last decade that have vastly expanded our knowledge base. The first is the World Fertility Survey (WFS) in 1987-1988.

Susan H. Cochrane is principal population economist in the Division of Population, Health, and Nutrition of the World Bank's Population and Human Resources Department.

the late 1970s and early 1980s; the second is the Demographic and Health Survey (DHS) in the late 1980s and early 1990s. We do know that fertility is very high in Africa. We all agree on this. In that respect and in the high family-size preference, Sub-Saharan Africa appears different from other regions today. There are similarities with other regions as well, such as the very high fertility in parts of the Middle East, the very high fertility among the least educated in Latin America until very recently, and the high levels of fertility among older women in North Africa. If we had evidence on Asia, or even more on Latin America, two, three, or four decades ago, we might find other similarities.

A paper I did with Samir Farid using data from ten WFS surveys (Cochrane and Farid 1989) of ten countries around 1980 showed that in comparing the completed fertility of older women with the current childbearing patterns in seven of the countries, fertility had probably risen in the past decade or two. In two countries it had remained constant, and in Ghana there was some evidence of a small decline.

That paper was completed in 1986 but was not published as a World Bank working paper until last year for a variety of reasons, so it is already dated. In it we concluded that fertility decline had not begun in Sub-Saharan Africa, despite the fact that it had proceeded very rapidly in other countries in Latin America and Asia, even in very poor conditions.

We also saw no evidence of impending decline, given both very high preferences for children and small socioeconomic differentials in fertility.

A new review of preliminary data from eleven DHS surveys for the late 1980s shows a different picture (van de Walle and Foster 1990). Part of the difference arises from the fact that the sample of countries is quite different (see table 1). The picture from the new surveys, some ten years after the first, suggests that in the past couple of decades fertility has possibly declined in all of them over the long run, and that this decline was as much as 10 percent in Botswana, Ghana, Kenya, Ondo State in Nigeria, Togo, and especially in Zimbabwe.

Only Ghana, Kenya, and Senegal have data from both sets of surveys. I will focus on these. Botswana and Zimbabwe have data from other censuses and surveys that would allow a longitudinal analysis as well, but I don’t think Caldwell is questioning that these declines have been real—only that they are special cases.

I should add that I’m not particularly worried that we may have been blind in not seeing impending decline in fertility in our earlier paper. In a paper presented at a seminar last summer on “The Role of Family Planning Programs in Fertility Decline,” one of the notables in the field, Ronald Freedman, concluded that “although the magnitude of fertility change falls far short of most optimistic predictions, the achieved change in Third World countries was not expected by most observers twenty to twenty-five years ago. Even ten years ago the subsequent changes were not anticipated” (Freedman and Freedman 1989).

With this in mind, let’s look at the most recent data. First, let’s examine Ghana, where we had seen some evidence of an earlier slight decline (table 1).
<table>
<thead>
<tr>
<th>Country</th>
<th>Cumulative fertility for all women aged 45–49 (F)</th>
<th>Current fertility rate (in 0–5 years before each survey) (F)</th>
<th>P/F</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Fertility Surveys</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benin, 1981–82</td>
<td>6.27</td>
<td>7.08</td>
<td>0.89</td>
</tr>
<tr>
<td>Cameroon, 1978</td>
<td>5.18</td>
<td>6.40</td>
<td>0.81</td>
</tr>
<tr>
<td>Côte d'Ivoire, 1980–81</td>
<td>6.84</td>
<td>7.36</td>
<td>0.92</td>
</tr>
<tr>
<td>Ghana, 1979–80</td>
<td>6.71</td>
<td>6.47</td>
<td>1.04</td>
</tr>
<tr>
<td>Kenya, 1977–78</td>
<td>7.88</td>
<td>8.25</td>
<td>0.96</td>
</tr>
<tr>
<td>Lesotho, 1977</td>
<td>5.29</td>
<td>5.76</td>
<td>0.92</td>
</tr>
<tr>
<td>Mauritania, 1981</td>
<td>6.00</td>
<td>6.25</td>
<td>0.96</td>
</tr>
<tr>
<td>Nigeria, 1981–82</td>
<td>5.84</td>
<td>6.34</td>
<td>0.92</td>
</tr>
<tr>
<td>Senegal, 1978</td>
<td>7.16</td>
<td>7.15</td>
<td>1.00</td>
</tr>
<tr>
<td>Sudan (N.), 1979</td>
<td>5.98</td>
<td>6.02</td>
<td>0.99</td>
</tr>
<tr>
<td>Demographic and Health Surveys</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Botswana, 1987</td>
<td>5.8</td>
<td>5.0</td>
<td>1.16</td>
</tr>
<tr>
<td>Burundi, 1987</td>
<td>6.9</td>
<td>6.8</td>
<td>1.01</td>
</tr>
<tr>
<td>Ghana, 1986</td>
<td>7.25</td>
<td>6.43</td>
<td>1.13</td>
</tr>
<tr>
<td>Kenya, 1988</td>
<td>7.5</td>
<td>6.7</td>
<td>1.12</td>
</tr>
<tr>
<td>Liberia, 1986</td>
<td>6.4</td>
<td>6.3</td>
<td>1.02</td>
</tr>
<tr>
<td>Mali, 1987</td>
<td>7.06</td>
<td>6.73</td>
<td>1.05</td>
</tr>
<tr>
<td>Ondo State, Nigeria, 1986</td>
<td>6.9</td>
<td>6.0</td>
<td>1.15</td>
</tr>
<tr>
<td>Senegal, 1986</td>
<td>7.0</td>
<td>6.4</td>
<td>1.09</td>
</tr>
<tr>
<td>Togo, 1988</td>
<td>7.28</td>
<td>6.21</td>
<td>1.17</td>
</tr>
<tr>
<td>Uganda, 1988–89</td>
<td>7.77</td>
<td>7.30</td>
<td>1.06</td>
</tr>
<tr>
<td>Zimbabwe, 1988</td>
<td>6.87</td>
<td>5.70</td>
<td>1.21</td>
</tr>
</tbody>
</table>

Sources: van de Walle and Foster 1990.

This historical decline is confirmed in the most recent data. But whatever decline there was in previous decades has not continued. The current fertility rate in the most recent survey is 6.43, compared with 6.47 for 1979–80 (these fertility rates are measures of average number of live births per woman if the woman experienced the current age-specific fertility rates throughout her life). The other West African case, Senegal, does give some evidence of a decline both historically (9 percent) and, recently, more dramatically, 7.15 to 6.4 in the total fertility rate. Ondo State is difficult to evaluate, because the WFS was not available on a statewide basis, and southwestern Nigeria has lower fertility. Table 2 outlines the trend in fertility in Senegal, according to the WFS and the preliminary report of DHS. For all women up to the age of thirty-five years, the number of live births has decreased by about 8 to 10 percent. Socioeconomic differentials are also emerging among women twenty-five to twenty-nine, but are not apparent among older women forty-five to forty-nine. Knowledge of contraception has increased from 59 to 90 percent of women, and contraceptive use has increased more modestly from 4 to 12 percent, but modern methods have only increased from 0.6 to 2.7 percent. Although detailed analysis has not yet been done,
Table 2. Fertility Indicators for Senegal

<table>
<thead>
<tr>
<th>Indicator</th>
<th>World Fertility Survey (1978)</th>
<th>Demographic and Health Survey (1986)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of live births at</td>
<td></td>
<td></td>
</tr>
<tr>
<td>age in years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15–19</td>
<td>0.44</td>
<td>0.32</td>
</tr>
<tr>
<td>20–24</td>
<td>1.69</td>
<td>1.57</td>
</tr>
<tr>
<td>25–29</td>
<td>3.39</td>
<td>3.09</td>
</tr>
<tr>
<td>30–34</td>
<td>5.28</td>
<td>4.74</td>
</tr>
<tr>
<td>35–39</td>
<td>5.94</td>
<td>6.16</td>
</tr>
<tr>
<td>40–44</td>
<td>6.80</td>
<td>6.83</td>
</tr>
<tr>
<td>45–49</td>
<td>7.16</td>
<td>7.27</td>
</tr>
<tr>
<td>Percentage knowing a method of contraception</td>
<td>59</td>
<td>90</td>
</tr>
<tr>
<td>Percentage using contraception</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modern methods</td>
<td>0.6</td>
<td>2.7</td>
</tr>
<tr>
<td>Traditional methods</td>
<td>3.3</td>
<td>9.0</td>
</tr>
</tbody>
</table>


preliminary indications are that fertility decline may be incipient. Unfortunately, the preliminary data do not contain information on family-size preferences. These data are necessary to evaluate the unmet need for family planning, which would help determine what is likely to occur as family planning programs become more widely available.

Kenya presents a more dramatic picture, as indicated in table 3. The number of children ever born to older women appears to have decreased slightly, and the current measure of fertility (that is, the measure among women of childbearing age in the year of the survey) has dropped from 8.25 to 6.7. Whether the drop in fertility is as large as it appears is uncertain, but there is substantial backup evidence to indicate that there is a real decline even if it has not been as large as 1.5 children. For example, substantial fertility differentials between rural and urban dwellers and among educational groups are now evident, which is an indicator of change. The mean number of children desired has also declined dramatically among all education groups. Contraceptive use has increased as well from 6 percent in 1977–78 to 27 percent in 1989. Further data analysis is required to reconcile various data sources and to check for the internal consistency of information on marriage, breastfeeding, and contraceptive practice, but I think that there is little doubt that something real is going on.

Although there is, therefore, some basis for optimism about fertility decline in Sub-Saharan Africa, we need to examine carefully the policy conclusions of the decline that we have observed in Botswana, Kenya, and Zimbabwe and the decline that has stagnated in Ghana. I want to congratulate Professor Caldwell for pointing out that it does take resources to bring about decline. He has taken the discussion away from the false dichotomy over whether it is demand or the
### Table 3. Fertility Indicators for Kenya

<table>
<thead>
<tr>
<th>Indicator</th>
<th>World Fertility Survey 1977–78</th>
<th>Demographic and Health Survey 1986–88</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fertility trends</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P: Children ever born (of women ages 45–49)</td>
<td>7.88</td>
<td>7.50</td>
</tr>
<tr>
<td>F: Current fertility</td>
<td>8.25</td>
<td>6.70</td>
</tr>
<tr>
<td>Ratio: P/F</td>
<td>0.92</td>
<td>1.12</td>
</tr>
<tr>
<td><strong>Total fertility rate, by place of dwelling</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major urban</td>
<td>5.90</td>
<td>-</td>
</tr>
<tr>
<td>Other urban</td>
<td>6.08</td>
<td>-</td>
</tr>
<tr>
<td>All urban</td>
<td>-</td>
<td>4.30</td>
</tr>
<tr>
<td>Rural</td>
<td>8.48</td>
<td>7.10</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>8.28</td>
<td>7.50</td>
</tr>
<tr>
<td>1–3 years</td>
<td>9.21</td>
<td>-</td>
</tr>
<tr>
<td>Some primary</td>
<td>-</td>
<td>7.50</td>
</tr>
<tr>
<td>4–6 years</td>
<td>8.43</td>
<td>-</td>
</tr>
<tr>
<td>Complete primary</td>
<td>-</td>
<td>6.40</td>
</tr>
<tr>
<td>7 or more years</td>
<td>7.34</td>
<td>4.80</td>
</tr>
<tr>
<td><strong>Mean number of children desired, by years of education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>7.64</td>
<td>5.40</td>
</tr>
<tr>
<td>1–3 years</td>
<td>6.88</td>
<td>-</td>
</tr>
<tr>
<td>Some primary</td>
<td>-</td>
<td>4.60</td>
</tr>
<tr>
<td>4–6 years</td>
<td>6.36</td>
<td>-</td>
</tr>
<tr>
<td>Complete primary</td>
<td>-</td>
<td>4.10</td>
</tr>
<tr>
<td>7–9 years</td>
<td>5.98</td>
<td>-</td>
</tr>
<tr>
<td>10 or more years</td>
<td>5.13</td>
<td>3.60</td>
</tr>
<tr>
<td><strong>Family planning prevalence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage who used contraceptives</td>
<td>6</td>
<td>27b</td>
</tr>
<tr>
<td>Percentage who knew source of family planning</td>
<td>38–45</td>
<td>89b</td>
</tr>
</tbody>
</table>

— Not available.

a. Any method, among people currently married.
b. Data from DHS 1989.

*Sources:* World Fertility Survey and Demographic and Health Survey reports.

supply of family planning programs that matters. It is clearly both, and there is interaction between the two elements that was left out of much of the earlier thinking. Ghana is an example. Although the percentage of women who want no more children in Ghana has doubled over the last decade, and more than half the women want to postpone their next birth, contraceptive use has only increased from 10 to 13 percent. Use of the pill has fallen while the proportion using abstinence has doubled. The single most frequent reason stated for not using contraception is lack of knowledge. All these factors indicate that lack of a well-funded and well-executed family planning program has played some role in the failure for fertility decline to continue in Ghana.

How much resources are required is, however, uncertain. Programs such as Matlab in Bangladesh cost about US$15 per person a year for pill use based on a home-visit program such as that advocated by Caldwell (see Family Health
International 1990). To achieve a 50 percent coverage of all women of reproductive age in each country by 1995 would require about US$1.85 per capita of the total population a year based on the Bangladesh costs.

The costs of preventing a birth or achieving a couple of years of contraceptive protection, however, appear to depend on the level of demand to restrict fertility in the population. For example, in a recent paper (Cochrane and Sai 1989), we indicated that the cost of averting a birth declined by about $5 from an intercept of $350 for every additional percent of women wanting no more children. Thus data from about 1977 to 1982 indicated that the cost of a birth averted in Kenya was between $350 and $386 in 1987 prices. If the relation holds, one would expect that currently the cost might be as low as $125, because the proportion wanting no more children has risen to almost 50 percent. Thus how much it will cost will depend on the level of demand to restrict fertility. This gets back to Caldwell's hypotheses about what motivates fertility in Africa. He is far better able to judge this than I am, but it should be pointed out that the very sharp drop in desired family size in Kenya and Zimbabwe indicates that those preferences are not as stable as was once believed, even by me. The shift in preference may be the result of lagged responses to modernization, sharp changes in the calculus of the cost of children, or maybe even changes in the cost to the family of restricting fertility. This is a subject on which we are trying to gain some insight from a recently funded World Bank research project on Colombia, Tunisia, and Zimbabwe, all countries in which fertility has shown substantial decreases.

Caldwell, in his paper, and Cochrane and Zachariah (1983) identify the role of infant mortality as of major importance in determining fertility decline in Sub-Saharan Africa, in part at least through its effect on the desire to restrict fertility. As Caldwell suggested, this implies that expenditures on family planning need to be incorporated into a substantial health program. Rough estimates of the central government health expenditures in Botswana, Kenya, and Zimbabwe indicate that they spend $21, $5, and $9 per capita, respectively. This is 2 percent, 1.5 percent, and 2 percent of gross national product, respectively. These are about half the percentages cited by Caldwell. In Kenya and Zimbabwe, however—I don't know about Botswana—the private sector, nongovernmental organizations, and so on provide an additional amount of coverage equal to that of the central government. This would indicate that health expenditures are about twice the indicated figures, and it shows a level of expenditure on health in these successful countries that is very similar to what Caldwell estimates.

Until this point I have been focusing on fertility decline without addressing the question of whether fertility decline is a good thing. I now think it is necessary to move beyond the data-based discussion to the broader questions of consequences of both population growth and of AIDS and the policies that they imply.

**Economic Consequences of Rapid Population Growth**

Caldwell is skeptical about the negative consequences of rapid population growth in Sub-Saharan Africa. His view is shared by many and for some very
good reasons. I do not have the time or inclination to get into a long debate here. I am sure Ronald Lee's paper (this volume) will generate substantial debate on the topic. Let me say just three things.

Just as Caldwell separated the effect of population growth into the rate of natural increase and the rate of migration, it is also necessary to separate out the differential impacts of mortality and fertility in assessing population growth's effect. It is necessary to make that separation because there are two directions of causation between population growth and income growth. The natural rate of increase is simply the difference between the crude birth rate and the crude death rate. In the long run, mortality is affected by the level of income. Thus increases in income will "cause" an increase in population growth by reducing mortality. This can easily mask the effect of population growth on income and income growth. Moreover, changes of population growth can be expected to have differential impacts depending on the combination of mortality and fertility rates that generate a rate of population growth. A country with high mortality and high fertility and one with low mortality and low fertility will both have low population growth rates, but they may have very different effects on the economy. Reductions in mortality that represent improvements in the health of the population can be expected to stimulate productivity, possibly open up previously disease-ridden areas, and result in savings in health care. Thus the two low-growth situations would have very different expected consequences.

This hypothesis has been tested by Blanchet (1988). His paper deserves more attention than I can give it here, but his simple correlations for approximately eighty countries between population growth and income growth and between population growth and birth and death rates are instructive. For the three time periods he uses (1960–70, 1960–80, and 1970–80), whether samples weighted by population or unweighted samples are used, the death rate is always significantly negatively related to income growth, whereas the birth rate is also always significantly negatively related to income growth.

Given this finding, what is the relation between population growth that combines birth and death rates and income growth? That depends on whether weighted or unweighted samples are used and on the time period. With the weighted samples, population growth is positively associated with income growth for the 1960–80 and 1960–70 periods and insignificant for 1970–80. For unweighted samples, population growth is not related to income growth until 1970–80, when its correlation is negative. What this tells us—which is what we should have known all along—is that the interactions between population growth and income growth vary, depending both on the balance of factors causing the population growth and on the economic circumstances. This pattern of interaction is borne out very realistically by the changes in population policies in Algeria and Nigeria when oil prices plummeted. Both of these countries could afford the burden of rapid population growth as long as oil prices were high. Once prices fell, however, they felt the pinch and shifted policy in favor of reductions in population growth.

The second point I wish to make on economic consequences is that the conse-
quences of high fertility and rapid population growth may not appear in the growth of income but in its distribution. This point seems to have been neglected in the focus on growth and efficiency alone. There are two ways that population growth will affect distribution adversely. The first, and most obvious, is that because the most rapidly growing part of the population is usually the poor, whose only resource is their labor, their wages will be suppressed by rapid growth of the labor force, all things being equal. The second is less researched. Many who discount the “population problem” say that markets will adjust through increased prices to ration scarce resources. The problem is that the poor will be the hardest hit by the adjustment, whether it is increases in the price of water or fuel or food.

Third, the problem of population growth in the 1960s was as compelling as the problem of the greenhouse effect is today. A recent meeting of scientists and policymakers on the greenhouse effect said that the problem was so serious that we couldn’t wait for data to confirm it. This is what happened in population. As Caldwell mentioned, a great deal of the work on the effect of population growth has been prospective in nature, and not enough has been done to explore carefully the mechanisms whereby population growth’s multiple effects on income and equity have been modified or magnified by policies. A nice exception is the paper Paul Schultz (1987) wrote for the National Academy of Sciences’ study of consequences. He showed that rapid population growth in the developing world did not decrease enrollment rates but did reduce the quality of education.

PROBLEMS AND POLICY IMPLICATIONS OF AIDS

Let me conclude with a few words on AIDS. There can be no doubt that the human, economic, and demographic impacts of AIDS in Africa will be dramatic. Mead Over and colleagues (1988) have calculated the direct costs of treating AIDS and the indirect costs of the loss of productivity and loss of life for two African countries. The range of estimates is quite large, given our small knowledge base. Nonetheless, they indicate two important things: (1) the direct plus indirect cost per human-immunodeficiency-virus-positive individual ranges from five to nineteen times per capita income in Zaire and Tanzania, and (2) the indirect cost of forgone earnings is much larger than the direct cost of treatment, ranging from five to sixty-six times as great (Over and others 1988). These drastic economic effects do not begin to convey how disruptive to life in general and to any orderly evolution of development such an epidemic may be.

It is undoubtedly extremely important to address this issue. The cost of AIDS programs will have to cover treatment and prevention. In prevention there is the education on causes of AIDS, the supply of barrier methods of contraception, and the treatment of sexually transmitted diseases (STDs). To adequately deal with the last problem, as Caldwell correctly indicates, will require substantial resources. In particular, family planning programs will have to be altered to provide the clinical base for the diagnosis and treatment of STDs. This is in addition to the community- and home-visit-based distribution of family planning.
In conclusion, I am not as convinced as Caldwell that the underbelly is so soft. I think that continuing rapid population growth will begin or has begun to have negative consequences for the countries of Africa. (Household negative consequences determine family-size preferences; in addition, they determine some of the negative effects of high fertility for society.) If these negative consequences only emerged with faster development, Caldwell might be right in his pessimism about a fertility decline in Sub-Saharan Africa, but what I am hearing is that the stagnation or even declines in incomes have made people become more sensitive to the economic costs of children, and this has led to substantial reductions in family-size preferences in parts of Africa. Where family planning services are available, this has translated into increased use of contraception and reduced fertility. The family consequences of high fertility are, thus, a major area of research that needs to be pursued in Africa if we are to understand the future course of fertility decline. That said, we must conclude that AIDS may change everything.

REFERENCES


FLOOR DISCUSSION OF THE CALDWELL PAPER

The discussion opened with observations from members of the audience. A World Bank participant emphasized the role of international and domestic migration in the population dynamics of Africa. He noted that the economic crisis in Africa clearly has reduced mobility and has hampered the efforts of individuals to survive and develop, and he argued that population redistribution deserves much more attention in research on development policy. The same participant also noted that economists have so far not understood the full contours of economic growth in Africa, especially as regards activity in the informal or unrecorded economy. Revising the economic indicators to account for these phenomena would change the picture of the relationship between population growth and economic growth, he said.

Another member of the audience agreed with Caldwell's judgment that the failure of mortality to decline, especially child mortality, may slow the decline of fertility in Africa. But she cited recent Demographic and Health Survey (DHS) data from Nigeria as indicating significant fertility declines stemming from increased use of contraceptives, especially among educated women. She also wondered whether Caldwell, in expressing skepticism about fertility transition in Sub-Saharan Africa, had fully considered the effects of economic crisis on population decline, especially for a country such as Nigeria, in the light of the recent austerity measures there.

A member of the audience expressed surprise at Caldwell's statement in the paper about the efficacy of government intervention in producing fertility declines at any level of socioeconomic development. He noted that even where government antinatalist policies have been very strong, as in China, it remains questionable whether development and broader socioeconomic factors have not been substantially more responsible for fertility declines. Moreover, even if government fertility-limiting policies can produce fertility declines at varying levels of development, the question is whether such declines are sustainable.

This same participant agreed with Caldwell on the importance of the public and democratic provision of health services and education, especially of females, in moderating population growth. He suggested that World Bank policies toward the pricing and provision of such public services are narrowing access and thereby might delay the fertility decline.

This session was chaired by Frederick T. Sai, senior population adviser in the Population and Human Resources Department of the World Bank.

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Jack Caldwell began by replying to Ron Lesthaeghe’s comments on his paper. To Lesthaeghe’s comment about the need for caution in exporting population prescriptions learned in one context to another, and the need to stay away from grand theory, Caldwell replied that despite the need to tailor transition theories to the specific socioeconomic circumstances of the countries or regions in question, broad forces—such as the evolution of nuclear families, female education, duration of postpartum sexual abstinence and breastfeeding, and so on—provided useful cross-cultural indicators of fertility transition. Caldwell noted that demographers had correctly predicted fertility transition in Asia as far back as the 1950s by looking at such indicators. He had himself produced a population projection showing declining fertility in Singapore in 1959 and was assailed because it contradicted prevailing stereotypes about Chinese family structures and marital practices. In fact, the decline was already under way, but the data were not yet reflecting it.

Caldwell also briefly acknowledged Lesthaeghe’s comment that his paper had not given consideration to “halfway” fertility transitions, which are followed by a plateau of stable population growth, or even temporary reversals. Caldwell said, however, that such phenomena were part of the generally complex path of many transitions, and he was doubtful if there was a simple model of halfway transition. Caldwell also responded to Lesthaeghe’s observation that Sub-Saharan Africa might be subject to a “crisis-led” decline reflecting a rising cost of children, perhaps in the context of structural adjustment. Caldwell acknowledged that Sub-Saharan governments were responding to economic crisis and that if strong enough, this response might have some effect in catalyzing fertility transition. He remained skeptical, however, about the individual-based, crisis-led fertility transition. In fact, he noted, in times of economic crisis most people saw themselves become more dependent on children.

Responding to the observation about the possibility of imminent fertility declines in Nigeria, Caldwell noted that he was not quite so sanguine. He interpreted the DHS results to show lower levels of current contraception use by married women than government statistics on contraception provision would indicate. He said he stood to be corrected, but at least in the Ekiti area of Ondo State in Nigeria, there was evidence that fertility had risen due to a decline in postpartum sexual abstinence from the relatively high levels relative to the rest of Sub-Saharan Africa. The evidence suggests that the duration of postpartum sexual abstinence was linked to the duration of breastfeeding, which had declined steeply during the Nigerian oil boom, partly because there was more supplementary food. The rise in fertility, Caldwell felt, was also consistent with the World Bank’s projections, which show in the immediate future a substantial number of countries where fertility is likely to rise.

Caldwell responded to the participant who had questioned the efficacy of government intervention in fertility in China by arguing that the methods used there had been so absolute and thoroughgoing that they would produce fertility declines at any stage of development. He pointed out, however, that the social
and political culture of Africa made it unlikely that any African government could get away with such extensive intervention; so, he agreed that it would not be sustainable in Africa.

Regarding Susan Cochrane’s (discussant) remarks, Caldwell agreed that Botswana, Zimbabwe, and central (and adjoining parts of eastern and western) Kenya evidenced clear fertility declines, but he wondered whether the World Bank’s projections for rapid fertility declines in Botswana and Zimbabwe could be supported by the existing evidence. He cautioned against attributing the lagging fertility decline in Ghana and West Africa to economic stagnation and program failures, such as the poor availability of birth control pills in Ghana. Caldwell suggested—as a reason for his skepticism about the Bank’s population projections—that although the West African coast has had a longer history of development in some ways than much of the rest of Africa, it also has more cultural structures that are likely to oppose fertility decline as compared with East and Southern Africa. For example, Caldwell was skeptical about the accuracy of research findings—especially comparisons of different general surveys studying fertility control—indicating that under economic stagnation, West African women were increasing sexual abstinence, amounting to a doubling of the use of abstinence in Ghana. Female abstinence in various forms has always been used in West Africa, and actual figures that the general-purpose surveys yield for how much female abstinence is being applied for contraception therefore are likely to be haywire. To study this, Caldwell maintained, one needs a specific research project looking at the role of female abstinence. Caldwell felt that Cochrane had reported some very interesting findings about the relationship between fertility, mortality, and income growth, which he would like to investigate further.

Caldwell fully agreed with Cochrane that the implications of the AIDS epidemic in Africa needed to be studied more extensively, and he suggested that all the international bodies dealing with family planning were avoiding dealing with the epidemic’s implications for family planning programs. Caldwell reiterated his belief that tackling AIDS in Sub-Saharan Africa is one of the world’s great obligations of the late twentieth and early twenty-first centuries. He suggested that this effort required devoting significantly increased levels of resources to health services in Sub-Saharan Africa, partly with the focus on treating sexually transmitted diseases that increase the transmission rate of AIDS. He also noted that this effort would have the additional benefit of enhancing child survival and so decreasing the motivation to have additional children.

Cochrane followed up on this topic by emphasizing that to diagnose and treat sexually transmitted diseases will require clinics—community-based or household visit systems will not suffice—and this will require additional resources. Cochrane added that Caldwell is absolutely right in emphasizing the relevance of the AIDS crisis for family planning efforts, especially in light of the protocols for interventionist family planning—whether injections, intrauterine devices, implants, or sterilization.
Sai (chair) noted that the AIDS crisis was now being addressed in family planning work for West Africa by the International Planned Parenthood Federation, with funding from the U.K. Overseas Development Agency. He added that as a West African, he agreed with Caldwell that weight should be given to the cultural factors in Sub-Saharan Africa that discourage fertility decline. But he also suggested that the lagging economic development of some areas of Africa that were once the equal of Asian economies, such as the Republic of Korea, can also be attributed to "bankrupt ideologies" and dilatory implementation in the policy realm. Sai thanked Caldwell, the commentators, and the audience and adjourned the session.