

WORLD DEPOPULATION

Last One Out Turn Off the Lights

The year 2000 will conclude a century of utterly unprecedented population change – an abrupt, dramatic departure from previous experience. And the best is yet to come: I predict that developments in the 21st century will unfold in ways that startle even battle-tested demographers who think they are beyond surprise.

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Although exact global numbers can never be known, population counters generally believe that the number of humans on the planet exceeded six billion sometime last year, and will total about 6.08 billion by the middle of this year. Data for the year 1900 are naturally even less precise, but a reasonable guess for the total population in that year is around 1.65 billion. Thus, in a century, world population almost quadrupled. No previous population boom even comes close, in either percentage terms or absolute numbers.

By historical yardsticks, moreover, the

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population explosion continues. The two premier demographic agencies, the United States Census Bureau and the United Nations Population Division, both project a rate of increase of 1.3 percent this year. That is more than twice the average rate in the 19th century and something like four times the pace across the entire millennium. The total population is increasing by almost 80 million people a year – perhaps 10 times the average annual increase in the 19th century.

Yet, paradoxically, the trend appears to have reached a monumental turning point. For as the 21st century commences, the tempo of population growth is unmistakably

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in decline.

As rapid as the current rate of natural increase appears to be against the backdrop of history, it is nonetheless considerably slower than in the immediate past. In the early 1960's, for example, the pace exceeded 2.2 percent per year – a percentage point greater than the rate anticipated for the year 2000. The growth in absolute numbers apparently peaked at 85 million a year in the late 1980's, and has since been declining gradually.

THE LONGEVITY EXPLOSION

To estimate population trends, it is necessary first to understand the forces that generated the explosive acceleration, the peak, and the decline in the world's population growth during this century.

The population explosion was entirely the result of health improvements and the consequent expansion of life expectancy. Between 1900 and 2000, life expectancy at birth at least doubled from something like 30 years to 63 years. Indeed, other things being equal, that health explosion would have resulted in a far greater growth in human numbers than has actually been witnessed. Rough calculations suggest that the world's population would be more than 50 percent larger today if our century's recorded revolution in longevity had unfolded in the absence of declining birth rates.

SECULAR FERTILITY DECLINE

The world's population currently totals about six billion, rather than nine billion, because fertility patterns were also changing over the century. And of all the diverse changes in fertility trends registered over the past 100 years, the most significant has been "secular fertility

decline” – that is to say, sustained and progressive reductions in family size due to deliberate birth control.

In historic terms, this trend is a very new phenomenon: it apparently had not occurred in any human society until about two centuries ago. France, where the trend began by the early 19th century, was the first country to experience a sustained decline. Since that beginning, the decline has spread unevenly across the planet, embracing an ever-greater fraction of the global population and depressing voluntary childbearing in the affected societies to successive record lows.

A milestone in the process was passed during the era between the world wars. Fertility rates in the industrial countries during peacetime dropped below the “net replacement” level – that is, below the level necessary for long-term population stability.

The inter-war fertility dip proved to be temporary, however, neither sufficiently prolonged nor sufficiently deep to bring on actual population decline. Indeed, the postwar baby boom, presumably the result of postwar optimism and pent-up demand for children, erased visions of negative population growth on this side of the Atlantic.

But in the last quarter-century, sub-replacement fertility has come back with a vengeance, slipping to levels previously unimaginable in prosperous societies at peace. Sub-replacement fertility has now been experienced for a generation or more in a growing number of countries, and it has come amazingly close to becoming the norm the world over. Indeed, almost half of the



world’s population now lives in societies that aren’t having enough babies to sustain their numbers.

In the early 1950’s, the planet-wide “total fertility rate” – the average number of children per woman per lifetime – is thought to have stood at about five. Next year, the global rate will likely be below 2.8. That dramatic reduction in five decades has already curbed the relative and absolute pace of world population growth, despite increasing life expectancy. But even more dramatic changes – ones never contemplated by Malthusians – lie ahead.

The past generation demonstrated that it is possible for fertility levels to fall with startling speed, even in low-income societies. And while we now know that countrywide fertility levels can plunge well below replacement and remain there for decade after decade, we do not yet know how low they can go. But it is entirely possible that, contrary to even quite recent expectations, sub-replacement fertility will soon typify the world as a whole. Were that to occur, the 21st century could turn out to be a time in which world population peaked and thereafter diminished.

The population has fallen before – in the

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14th century, for example. Those earlier reductions, however, were the consequences of catastrophes: bubonic plague decimated societies across Asia, Europe and North Africa between 1333 and 1355. The 21st century population implosion, by contrast, would take place under conditions of steadily improving life expectancy and living standards.

Even so, such a depopulation would confront the world with unique socioeconomic challenges – quite possibly formidable ones. Though negative population growth is not yet imagined to be a problem, we must now recognize that it is possible that such a trend, rather than Malthusian overpopulation, will emerge as the great demographic issue of the coming century.

FERTILITY TRENDS AT CENTURY'S END

Many analysts do not appreciate just how far low-fertility regimens have already progressed. To understand the current situation, divide the world into three categories: (1) countries where fertility levels are currently believed to be below replacement, (2) countries where fertility is above replacement but rapidly declining, and (3) countries where fertility levels remain high and seemingly immune to secular fertility decline.

1) Sub-replacement Fertility

Table 1 catalogues the countries in this first category. Since the numbers are ex-

trapolations based on recent history, they may exaggerate the dimensions of fertility decline. On the other hand, the population data for most places listed here is both relatively up-to-date and reasonably accurate. So it is equally likely that the numbers understate the trend. Indeed, this list, based on Census Bureau estimates, is more conservative than the United Nations Population Division's figures.

In all, 79 countries and territories, with 44 percent of the world's population, fit the below-replacement category. And the countries themselves are strikingly diverse in geography, culture and level of economic development.

Virtually every advanced industrial democracy is on the list. In fact, 27 of the Organization for Economic Cooperation and Development's 29 members have total fertility rates of less than 2.1 – the rate needed to replace the population over the long haul. The two exceptions, by the way, are Mexico and Turkey, countries at the low end of the Organization for Economic Cooperation and Development as measured by income and education. Within that group, the highest total fertility rates are in the United States (2.07) and Iceland (2.04) – levels just shy of replacement. At the other end, Germany and Spain's current rates are just over 1.2, and Italy's is even lower.

Most members of the Organization for Economic Cooperation and Development are in Western Europe, which had a collective total fertility rate of 1.4 in 1998. But overall fertility levels appear to be



CHRISTOPHER ARNESEN/TONY STONE

even lower in Eastern Europe – by Census Bureau reckoning, about 1.3. Bulgaria, in fact, has the lowest fertility level ever witnessed in a modern nation not at war, with women averaging only 1.14 births in a lifetime. Were that pattern maintained indefinitely, each new generation would be half the size of the one before. In all of Europe, only remote Albania and the tiny outposts of Gibraltar and the Faeroe Islands are thought to be above-replacement enclaves – and in those cases, only barely so.

Within the former Soviet Union, the fertility rate has fallen far below replacement since the collapse of the Soviet empire. While fertility rates in the six predominantly Islamic former Soviet republics all appear to be above the net replacement level (from Kazakhstan's projected total fertility rate of 2.1 to Tajikistan's 3.5), the other nine states are far below replacement. In the Russian Federation, by far the most populous of the former Soviet republics, fertility is a shade over 1.3. In the next largest, Ukraine, the rate is also just over 1.3 – as it is in Belarus and in the three Baltic states. With a projected fertility rate of 1.88, Moldova would rank as distinctly the most fertile European enclave within the former Soviet Union today.

Secular fertility decline, as already noted, originated in Europe. And today, virtually every population group of European origin in the world has a fertility rate below replacement. But these account for only about a bil-

TABLE I
COUNTRIES AND TERRITORIES
WITH SUB-REPLACEMENT FERTILITY IN 1998:
TOTAL FERTILITY RATES, US CENSUS BUREAU PROJECTIONS

OECD COUNTRIES		EASTERN EUROPE AND THE FORMER SOVIET UNION		LATIN AMERICA AND THE CARIBBEAN	
Australia	1.82	Bosnia & Herzegovina	1.14	Anguilla	1.98
Austria	1.37	Bulgaria	1.14	Antigua & Barbuda	1.74
Belgium	1.49	Croatia	1.54	Aruba	1.81
Canada	1.65	Macedonia (Former Yugoslavia)	2.06	Barbados	1.85
Czech Republic	1.17	Montenegro	1.76	Cayman Islands	1.34
Denmark	1.68	Romania	1.17	Cuba	1.56
Finland	1.73	Serbia	1.75	Dominica	1.9
France	1.63	Slovakia	1.27	Guadeloupe	1.84
Germany	1.25	Slovenia	1.17	Martinique	1.8
Greece	1.31	Estonia	1.29	Montserrat	1.83
Hungary	1.45	Latvia	1.2	Netherlands Antilles	1.84
Iceland	2.04	Lithuania	1.46	Puerto Rico	2.03
Ireland	1.82	Armenia	1.69	Saint Vincent & the Grenadines	1.97
Italy	1.19	Belarus	1.34	Trinidad & Tobago	2.09
Japan	1.46	Georgia	1.54	Turks & Caicos Islands	1.71
South Korea	1.79	Moldova	1.88		
Luxembourg	1.63	Russia	1.34		
The Netherlands	1.49	Ukraine	1.35		
New Zealand	1.91			AFRICA	
Norway	1.8			Saint Helena	1.5
Poland	1.36	NON-OECD EAST ASIA		Seychelles	1.98
Portugal	1.35	China	1.8		
Spain	1.21	Hong Kong S.A.R.	1.36	OTHER EUROPE	
Sweden	1.76	Taiwan	1.77	Andorra	1.23
Switzerland	1.46	Macau	1.55	Guernsey	1.68
United Kingdom	1.64	Singapore	1.46	Jersey	1.5
United States	2.07	North Korea	1.8	Lichtenstein	1.61
		Thailand	1.84	Malta	1.73
OTHER NORTH AMERICA				Man, Isle of	1.67
Bermuda	1.78			Monaco	1.7
Saint Pierre & Miquelon	1.6			San Marino	1.51

SOURCE: US Census Bureau

lion of the 2.5 billion people living in sub-replacement regions. Below-replacement fertility thus is no longer an exclusively European – or even predominantly European – phenomenon.

Much of the Caribbean is now bearing children at below the replacement rate. Island societies as culturally and economically diverse as Barbados, Cuba and Guadeloupe have fertility rates below that of the United States. A few tiny territories off the coast of Africa and in Micronesia have apparently also slipped into the sub-replacement category. But the largest concentration of sub-replace-

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ment populations is in East Asia. Japan was the first non-European society to report sub-replacement fertility in peacetime. The rate fell below replacement in the late 1950's and has remained there for the past four decades. The United States Census Bureau puts Japan's total fertility rate at 1.46 – and Japanese authorities say it is even lower.

All four East Asian tigers – Hong Kong, South Korea, Singapore and Taiwan – have



been at below-replacement fertility since the early 1980's. South Korea has the highest fertility level of that group, with a rate estimated at just under 1.8; Hong Kong, with a rate of 1.36, is lowest. Thailand's fertility rate also fell below replacement in the last decade; its current estimated rate is a bit over 1.8.

By far the largest sub-replacement population, though, is China's: total fertility dropped below net replacement in the early 1990's and was thought to be 1.8 for 1998. China's fertility, of course, has been affected by Beijing's two-decades-old population-control cam-

paign. It is only reasonable to suppose that the Chinese State Family Planning Commission's strident and muscular intervention in the name of a "One Child Norm" has had an impact. But it is not possible to say how great that impact has been – or what would happen if that program were abandoned.

2) Above-replacement, but Rapidly Declining, Fertility

Another large portion of humanity lives in countries where fertility is still above the net-replacement level, but is declining rapidly. Just how large a fraction of humanity this group encompasses, of course, depends upon one's definition of rapid.

According to the United Nations Population Division's most recent estimates, total fertility rates for less-developed regions dropped by half between the late 1960's and the late 1990's, from an average of six births per woman per lifetime to three. Of course, those averages were strongly affected by the trend in China, and China's circumstances were anomalous. But the Chinese experience should not divert attention from the breadth and scale of fertility declines in other low-income settings.

Table 2 presents United Nations Population Division estimates of fertility change between the late 1960's and the late 1990's in the 15 most populous developing countries – home to three-quarters of the population of the less-developed regions. During those three decades, fertility levels fell by over half in seven of the 15 – which is to say, in five countries besides China and Thailand. Two of those five (Brazil and Mexico) are traditional Catholic societies, while the other three (Bangladesh, Iran and Turkey) are Islamic. In all five, of course, there is great social pressure to produce large families.

Note that 12 of the 15 countries in Table 2

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experienced fertility declines of two-fifths or more while, in absolute terms, 10 of the 15 registered declines in total fertility of over three births per woman! Only one of the 15 (Ethiopia) has yet to reduce fertility significantly. Note, too, that despite the religion-based pronatal traditions of Mexico and Iran, their fertility rates have dropped by four births per woman in just 30 years.

Table 2 underscores a more general feature of the fertility decline now under way in low-income countries: there is no single obvious cause. We think of fertility as being inversely associated with living standards, and in a very general way it is. Yet one of the world's poorest countries, Vietnam, has a fertility level of 2.6 – about the same as the United States had a few decades ago. The rate of income growth is an equally problematic indicator of fertility decline. For while dramatic fertility reductions coincided with relatively rapid growth in Indonesia's gross domestic product, for example, the per capita gross domestic product actually shrank in Iran over those same years – and yet Iran's fertility declines were even steeper than Indonesia's.

We often hear that education, particularly education of women, has a big influence on fertility. But Table 2 shows no clear-cut pattern. According to the World Bank, Nigeria's 1995 adult literacy rate was higher than Egypt's – but its total fertility rate was also higher, and by almost two births per woman. Conversely, the World Bank estimates that adult literacy is currently 50 percentage

TABLE 2
UNITED NATIONS POPULATION DIVISION
ESTIMATED AND PROJECTED FERTILITY CHANGE
FOR TODAY'S 15 MOST POPULOUS LOW-INCOME
COUNTRIES: 1965/1970 TO 1995/2000

COUNTRY	PROJECTED POPULATION MID-YEAR 1999 (IN MILLIONS)	TOTAL FERTILITY RATE		TFR CHANGE	
		1965/1970 ESTIMATED	1995/2000 PROJECTED	PERCENTAGE	ABSOLUTE
China	1,267	6.1	1.8	-70	-4.3
India	998	5.7	3.1	-45	-2.6
Indonesia	209	5.6	2.6	-54	-3.0
Brazil	168	5.4	2.3	-58	-3.1
Pakistan	152	7.0	5.0	-29	-2.0
Bangladesh	127	6.9	3.1	-55	-3.7
Nigeria	109	6.9	5.2	-25	-1.2
Mexico	97	6.8	2.8	-60	-4.0
Vietnam	79	6.0	2.6	-56	-3.4
Philippines	74	6.0	3.6	-40	-2.4
Egypt	67	6.6	3.4	-48	-3.2
Iran	67	7.0	2.8	-60	-4.2
Turkey	66	5.6	2.5	-56	-3.1
Ethiopia	61	6.8	6.3	-7	-0.5
Thailand	60	6.1	1.7	-72	-4.4

The total fertility rate (TFR) is a measure of average births per woman per lifetime. 1999 and 1995/2000 figures are "medium-variant" projections.

SOURCE: United Nations, *World Population Prospects*

points lower in Bangladesh than in the Philippines, and the gap between male and female literacy rates is closer to 70 percentage points. Yet fertility is lower in Bangladesh than in the Philippines, and Bangladeshi fertility declines over the past three decades have been distinctly greater in magnitude.

It has become a matter of faith that government population control initiatives have been instrumental, if not indispensable, in fertility decline in low-income settings. And it is true that most of the developing countries reporting major fertility declines in recent decades did have national birth control programs in place – some of which were overtly coercive. But even though Brazil has never sponsored family planning, its fertility decline in percentage terms has been almost identical to Mexico's, where a strong national program operates. And although Brazil is both poorer and more poorly educated than Mexico, its

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fertility level is lower.

It is all too clear, then, that the standard socioeconomic predictors of fertility differences are of distinctly limited utility. Indeed, one is tempted to conclude that the strongest predictor of a country's fertility level is the calendar: virtually everywhere, fertility has been falling over time.

TABLE 3
FERTILITY DECLINE IN "RESISTANT" REGIONS:
ESTIMATES AND PROJECTIONS FOR SELECTED COUNTRIES,
1975/1980 TO 1995/2000

REGION OR COUNTRY	TOTAL FERTILITY RATE		TFR CHANGE	
	1975/1980 ESTIMATED	1995/2000 PROJECTED	PERCENTAGE	ABSOLUTE
MIDDLE EAST				
Algeria	7.2	3.8	-47	-3.5
Jordan	7.4	4.9	-34	-2.6
Libya	7.4	3.8	-49	-3.6
Morocco	5.9	3.1	-47	-2.8
Syria	7.4	4.0	-46	-3.4
SUB-SAHARAN AFRICA				
Botswana	6.4	4.4	-32	-2.0
Cote d'Ivoire	7.4	5.1	-31	-2.3
Kenya	8.1	4.5	-45	-3.7
Sudan	6.7	4.6	-31	-2.1
Zimbabwe	6.6	3.8	-42	-2.8

SOURCE: United Nations, *World Population Prospects*

3) High and "Resistant" Fertility

The third share of humanity lives in countries where total fertility rates are very high – say, 6.0 or more – and for which convincing evidence of fertility decline has yet to be reported.

People often assume that such countries typify low-income regions. But since fertility levels in the less-developed world as a whole are thought to have fallen by half over the past 30 years, that cannot be the case. In the entire Asian land mass, total fertility rates were down by half between the late 1960's and the late 1990's, from about 5.7 to 2.8. In Latin

America and the Caribbean, rates have fallen from roughly 5.6 to 2.7.

The regions where fertility remains highest (and where fertility declines have been least spectacular) are sub-Saharan Africa and the Islamic expanse to its north and east – more specifically, the Arab Middle East. These areas had a population of about 930 million in 1998 – a little less than one-fifth of the total for less-developed regions and a bit under one-sixth of the world's total.

Fertility levels are much higher within this agglomeration than in any other comparably sized group of nations. However, the image of uniformly high, persistently "traditional" fertility regimens is already badly outdated. A revolution in family formation patterns has begun in the region.

Table 3 suggests that it is no longer accurate to describe the Arab world as isolated from fertility decline. Over the past 30 years, in fact, fertility in "Northern Africa" – the territory stretching from Western Sahara to Egypt – is believed to have dropped by almost half, to an average of 3.3 births per woman. There are still outposts of awesomely high and nearly unyielding fertility: the Gaza Strip (with a total fertility rate of 7.3), Oman (5.9), Saudi Arabia (5.8) and Yemen (7.6). But these four places account for barely 40 million of the Arab Middle East's quarter of a billion people. Elsewhere, relatively rapid fertility decline is under way – even in some Arab countries. In Algeria, Libya, Morocco and Syria, total fertility rates have dropped by nearly half in just the past two decades. And there are now Arab countries – notably, Tunisia and Lebanon – where fertility levels are close to the net-replacement level.

Even less generally appreciated than the fertility reductions throughout the Arab world is the fact that fertility decline appears

to be under way in parts of sub-Saharan Africa too. The recent Kenyan experience is particularly noteworthy: over the past two decades, the country's total fertility rate fell by two-fifths, to an average of 3.7 births per woman.

Kenya speaks to another aspect of fertility decline in low-income countries worth bearing in mind: the long lag between its onset and the moment demographers can assay its magnitude. Like all sub-Saharan countries, Kenya lacks reliable vital statistics. Its population trends must therefore be divined from occasional censuses and episodic surveys.

Kenya collects more demographic information than most. Even so, the pace of the country's recent fertility declines has surprised the experts. In 1994, the United Nations Population Division's very lowest projection for Kenya for the early 1990's was a total fertility rate of 6.2. In fact, the total fertility rate was 5.4, almost one birth per woman lower than the lowest contemporary United Nations projections had imagined. By the same token, contemporary fertility estimates for some other sub-Saharan locales may be way off base.

WHAT HAPPENS NEXT?

Barring utter cataclysm, population trends in the next century will be dominated – indeed, determined – by trends in fertility. That's just a matter of arithmetic as long as death rates remain low and stable. But what course will world fertility trends take?

The United Nations Population Division's Expert Group Meeting on Below Replacement Fertility summarized the state of knowledge succinctly: "There exists no compelling and quantifiable theory of reproductive behavior in low-fertility societies." The same might be said about reproductive behavior in contemporary societies with higher levels of fertility.



As a practical matter, fertility prediction is educated guesswork.

Some eminent demographers, notably Charles Westoff, have advanced a "homeostatic" hypothesis suggesting that sub-replacement fertility rates will be drawn upward to replacement as if by "a magnetic force." But that is pure speculation. Other demographers have recently suggested that total fertility rates in stable industrial societies are unlikely to dip below 0.7 – the level already observed in eastern Germany after reunification. The discomfiting reality is that today's sub-replacement fertility patterns are terra incognita, and that demographers don't even have much to say about what happens once a population enters it.

The situation is not much more certain for countries still above the replacement rate. The demographer Dudley Kirk has argued that "no country has been modernized without going through the demographic transition" that leads to low levels of both mortality and

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fertility. But the definition of modernization must now be sufficiently elastic to stretch around cases like Bangladesh and Iran – countries where low average incomes, high incidences of extreme poverty, slow economic growth, mass illiteracy, high levels of mortality and other ostensibly nonmodern characteristics have proved compatible with mas-

TABLE 4
RAPID FERTILITY DECLINE IN LOW-INCOME COUNTRIES:
SELECTED EXAMPLES OF 25-YEAR CHANGES
IN ESTIMATED TOTAL FERTILITY RATES

REGION OR COUNTRY	PERIOD	TOTAL FERTILITY RATE		TFR CHANGE PER DECADE	
		INITIAL	FINAL	PERCENTAGE	ABSOLUTE
EAST ASIA					
China	1965/1970-1990/1995	6.1	1.9	-37	-1.7
Republic of Korea	1960/1965-1985/1990	5.6	1.8	-37	-1.5
Singapore	1950/1955-1975/1980	6.4	1.9	-39	-1.8
Thailand	1965/1970-1990/1995	6.1	1.9	-37	-1.7
LATIN AMERICA					
Colombia	1960/1965-1985/1990	6.8	3.2	-26	-1.4
Guyana	1965/1970-1990/1995	6.1	2.6	-29	-1.4
Mexico	1970/1975-1995/2000	6.5	2.8	-29	-1.5
MIDDLE EAST					
Tunisia	1970/1975-1995/2000	6.2	2.6	-30	-1.5
SUB-SAHARAN AFRICA					
Kenya	1970/1975-1995/2000	8.1	4.5	-21	-1.5

1995/2000 are "medium-variant" projections.

SOURCE: United Nations, *World Population Prospects*

sive voluntary reductions in fertility.

We now know, moreover, that fertility decline can kick in swiftly in low-income settings. As Table 4 attests, fertility levels have declined by 1.5 births per woman per decade in some countries for a full quarter of a century. In sub-Saharan Africa, total fertility has been falling by 20 percent per decade, while in Latin America and the Middle East, the pace is around 30 percent per decade. The comparable figure for East Asia is nearly 40 percent, thus far sustained for two and a half decades.

Forget theory here. It is a fact that fertility levels have fallen by three-fifths in just 25 years in one Arab country (Tunisia) where upward of half of all women of childbearing ages have had no formal schooling, and by 45 percent in a sub-Saharan country (Kenya) with a dismal incidence of poverty. For whatever reasons, the constraints against fertility decline appear to be receding remarkably in our time – and may possibly continue to recede in the coming century.

The United Nations' medium-variant fertility projections envision a world 30 years hence with an overall fertility rate of 2.23 – 1.75 in more-developed regions and 2.31 in less-developed regions. That would mean a global population of 7.8 billion in 2025 and 8.9 billion in 2050.

While the die seems to be cast for the advanced industrial countries, it is easy to imagine the factors that significantly raised the pace of population growth above the medium variant elsewhere. For example, a slower-than-expected fertility decline in the Indian sub-continent.

Or a later-than-postulated advent of fertility decline in sub-Saharan Africa. Or the resumption of above-replacement fertility in China. But it is also possible to imagine alternatives that lead to a cessation of population growth and a subsequent depopulation, despite assumed steady improvements in life expectancy.

ONE SCENARIO FOR GLOBAL DEPOPULATION

The United Nations Population Division's

low-variant population projections, in fact, offer just such a vision. In this scenario, global life expectancies – and life expectancies in every region of the world – rise steadily over the first half of the century. But population crests in 2040 at 7.47 billion (growing by about 25 percent, or about 1.5 billion people, between now and then), drops by about 120 million between 2040 and 2050, and then continues to decline by over 25 percent per generation.

Of course, assumptions about fertility drive this model. The low-variant scenario imagines net-replacement fertility for the world as a whole by the years 2000-2005 – that is to say, more or less now – and sub-replacement fertility thereafter. We must therefore ask whether such presumptions are plausible.

One way of assessing these projections is to compare them to the recent historical past. Table 5 examines the low-variant model's assumed fertility declines for the three decades between the early 1990's and the early 2020's and compares them with the actually recorded declines over the three previous decades.

For every area of the world, these low-variant projections imagine vastly lower fertility levels by the early 2020's than ever before recorded. Some may regard that in itself as a sign of inherent implausibility. But looked at a bit differently, the low-variant projections simply suggest a continuation of existing trends – and in fact, a slight deceleration from the pace of decline between the early 1960's and the early 1990's.

The only region of the world for which the low-variant projections imply a faster fertility

decline is Africa. Here, fertility would have to fall as rapidly in absolute terms in the coming decades as it did in Asia from the early 1960's through the early 1990's. That likelihood is, of course, debatable. But in light of the Asian and Latin American experiences, one can hardly maintain that the low-variant projections for Africa are out of the realm of possibility. And the assumptions embodied in the

TABLE 5: GETTING TO DEPOPULATION: UNITED NATIONS POPULATION DIVISION 1998 LOW-VARIANT FERTILITY ASSUMPTIONS IN HISTORICAL PERSPECTIVE

REGION	TOTAL FERTILITY RATE		ASSUMED TFR CHANGE PER DECADE		ACTUAL TFR CHANGE 1960/1965-1990/1995 PER DECADE	
	1990/1995 ESTIMATED	2020/2025 ASSUMED	PERCENTAGE	ABSOLUTE	PERCENTAGE	ABSOLUTE
	WORLD	2.93	1.78	-15	-0.4	-16
MORE-DEVELOPED REGIONS	1.68	1.39	-6	-0.1	-12	-0.3
LESS-DEVELOPED REGIONS	3.27	1.84	-17	-0.5	-18	-0.9
Asia	2.85	1.64	-17	-0.5	-20	-0.9
Latin America & Caribbean	2.97	1.67	-17	-0.4	-21	-1.0
Africa	5.47	2.64	-22	-0.9	-7	-0.4

SOURCE: United Nations, *World Population Prospects*

scenario projecting a peaking and subsequent decline in global population do not seem especially heroic.

POPULATION ISSUES FOR A DEPOPULATING WORLD

If the pace of global fertility decline continues for another generation – and the world consequently heads toward negative population growth – the population issues of the future won't resemble those of the recent past. In a world of long life expectancies, small families and negative population growth, the Malthusian specter will cease to be relevant to public policy. On the other hand, pervasive and prolonged sub-replacement fertility in

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the context of generally improving health would pose social, political and economic challenges of its own.

Rising life expectancy guarantees that the world's population will be aging in the com-



ing century. If fertility is low and falling, it will age all the more rapidly. At the moment, the median age of the world's population is about 26 years. If the trajectory anticipated by the current United Nations low-variant projections were to come to pass, this figure would rise to 44 years – higher than the medians for even the “elderly” populations like Japan in our contemporary world.

Rapid global aging would have a number of ineluctable implications. For one thing, it would increase the salience of addressing the health-care and income-security needs of the elderly. In Western countries, current public programs for these purposes are coming under increasing demographic pressure, and require far-reaching overhauls to maintain their financial soundness. In low-income

countries, where coverage by public pensions and health systems is limited, the issue of how to take care of the elderly could be all the more pressing.

Rapid global aging would also likely force the question of how to train the workers of the future. It is not difficult to imagine circumstances in which a majority of a country's laborers were over the age of 50. And such a scenario would exacerbate the already existing tensions between an educational system designed to train the young and the desire of workers to enjoy long, worthwhile careers in an increasingly complex economy.

Finally, prolonged sub-replacement fertility in a world of long life expectancy would presage a radical change in family structure along the lines of one-child China. For the first time in the human experience, there could be societies in which the only biological relatives for many people would be their ancestors. With sufficiently low fertility for just two generations, people with blood siblings and cousins would become the exception. Exactly how a society would operate under such conditions – how, for example, children would be socialized – is difficult to imagine.

All this is merely constrained speculation. But if it does indeed turn out that today's sub-replacement fertility is only a foretaste of what lies in store, such speculation is hardly an indulgence. Long-term population decline under conditions of steady health improvement is not a disastrous demographic phenomenon – any more than were the 20th century's dual explosions of population and health. But an orderly global depopulation would require strange new adjustments – some of them wrenching – in both economies and societies. And we are more likely to cope with these changes successfully if we have contemplated them in advance. 

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